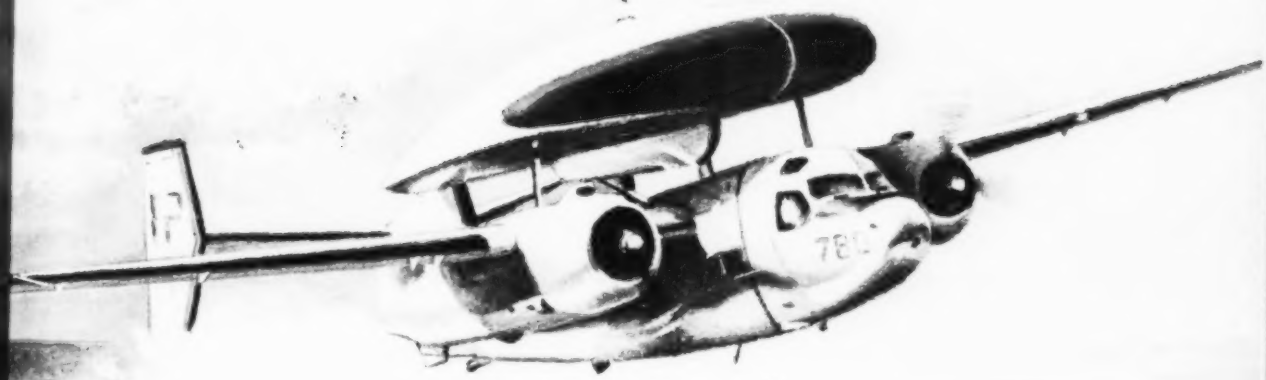
approach

JANUARY 1969 THE NAVAL AVIATION SAFETY REVIEW



Variation on a theme

MANY of you have recently returned from a long period of holiday leave. Hopefully, everyone found this a happy time of sentimental reunion with family and friends. It would not be surprising, therefore, if the prevailing mood on the first working day of the new year tended toward a reflection about the holidays rather than anticipation of the coming flight operations.

In addition to the likely tendency to reflect on the recent past there are more concrete problems which can result from an extended period of holiday leave. One potential problem is fatigue. We all know what fatigue is, in a general way, although there are many subtle manifestations of it which often go unrecognized. We are not so much concerned here with the subtler varieties as we are with the more blatant variety – the aviator who has spent part of the last night traveling and has not had sufficient rest. This is a distinct possibility on the first day of operations following the leave period. Such a condition will not be conducive to flight safety and positive steps should be taken to overcome the problem if it exists.

Loss of Proficiency

Controlling an aircraft involves physical skill and coordination which once acquired is not easily lost. However, it should be recognized that flight operations involve other factors which in the aggregate impose a far greater demand on the pilot than kicking rudders and jockeying stick and throttle. Proper attention must be given to those other factors when assessing the affect on pilot proficiency of an extended layoff from flying.

Continued

Every student or designated pilot must possess specific knowledge. All have been exposed to a great deal of education designed to impart the knowledge necessary for the effective operation or employment of his aircraft, but it is emphasized that this knowledge must be instantly at the command of the pilot to be most useful. Procedures designed to utilize this knowledge should be reviewed and repracticed to guard against a degradation of proficiency.

Depending on the training received, the pilot may be proficient in a number of areas, e.g., instrument flight, weapons delivery, tactics, etc. However, the pilot does not exist who is proficient in all aircraft and in all areas of aircraft employment. Consequently, every naval aviator is engaged in a continuing process of education and training to acquire and maintain specific proficiency.

Often, the acquisition of knowledge closely parallels the training situation. Therefore, at least a part of the knowledge required for successful completion of the next flight by *any* naval aviator *may* have only recently been acquired. In this respect, the most experienced naval aviator is little different from the least experienced student who struggles to remember procedures as he practices stall-recovery or landings.

An extended layoff from flying (such as holiday leave) should be recognized as cause for careful study and review of procedures by neophyte and pro alike.

Aircraft Maintenance

Many aircraft will not have been flown regularly during the leave period; some may not have been flown at all. Although they will have received periodic preflights, servicing and even turnups, some systems may not have been operated for an extended period. Particular care should be exercised to insure that aircraft are ready in all respects prior to flight.

To retain the professional approach, particularly after a prolonged layoff, lectures on work related topics should be given to all pilots and aircrewmen prior to flight.

Back in the Saddle
A Suggested Program

Safety in naval aviation should not rest upon a series of special or crash programs. Rather, it should depend upon the day-to-day application of the professional approach. A back-in-the-saddle program, then, is suggested only as an emphasis on professionalism. Emphasizing the professional approach will not only serve to minimize any adverse effects of the problems already mentioned but should have beneficial effects on future operations.

An effective program should have command support in order that it will result in coordinated action and benefit all. The aviation safety officer, under the C.O.'s direction, can do much to effect coordination. He should also assist in the planning, preparation and presentation of ground training lectures.

Ground Training

Depending upon the proficiency of assigned personnel and the type of flying involved consideration should be given to scheduling all pilots and aircrewmen for a series of lectures prior to flight. Suggested topics:

- Use of safety and survival equipment and related procedures.
- Aircraft preflight, ground handling, hand signals and normal flight procedures.
- Aircraft flight characteristics and operating limitations.
- Local course rules, flying areas, instrument procedures and SAR.
- Emergency procedures. These should receive detailed consideration.

In addition to lectures, maximum use should also be made of operational flight trainers and weapon system trainers to simulate emergencies and provide practice in procedures.

In order to obtain maximum benefit from the lectures it is suggested that they be conducted in an informal manner similar to the usual all pilots meeting. Discussion should be encouraged but guided by the speaker in order that all salient points will be covered. In

A simulated flight in an operational trainer can provide necessary re-familiarization of flight procedures and emergency situations.

addition, a comprehensive written examination at the end of the series will serve to expose any lack of understanding on specific points. The test should be regarded as an additional instructional technique rather than a rating device. After tests are completed, incorrect answers should be identified and the correct answers should be discussed with all present.

The question bank in each aircraft NATOPS manual is a ready source of material for the preparation of tests but the test should be supplemented with questions pertaining to local operations such as course rules.

Support Personnel

Consideration should be given to temporarily assigning senior petty officers in substantial numbers to the line to supervise aircraft servicing, preflight, starting, etc., until flight operations have been resumed on a routine basis.

Maintenance personnel, particularly on the line, may also benefit from a series of more or less formal lectures. Suggested topics:

- Operation of ground handling equipment.
- Preflight of aircraft, aircraft starting, ground handling signals, etc.
- Aircraft servicing, including:
  (1) Fuel
  (2) Oil
  (3) Hydraulics
  (4) Pneumatics
  (5) Oxygen

Scheduling

Scheduling considerations should include these points:

- *Have pilots scheduled had sufficient rest?* This may be difficult to determine but an attempt should be made to do so. Pilots should be encouraged to reveal any excess fatigue, lack of sleep or other factor which would dictate removal from the flight schedule. Also, if initial flight operations have been planned on a reduced scale, elimination of pilots from the schedule or substitution of other pilots, can be effected with a minimum of confusion.
- *What is the pilot's proficiency?* This should be considered. In the training command there are well-established provisions for warm-up flights after an extended layoff; however, they may not exist in operating units. Nevertheless, if a pilot performed his first solo checkout flight three weeks ago, a dual flight or other flight under close supervision may be in order. Likewise, a pilot who has had any new training cycle or syllabus interrupted should receive consideration for warmup or refresher training. In a word, the scheduled flight should closely conform to pilot proficiency.
- *What is the weather forecast?* There are times when flight operations may proceed full speed even in bad weather. This is probably not one of those times. If pilot proficiency has been degraded by the layoff from flight operations a little bad weather may be all that's needed to tip the scales against him.

The Individual Pilot or Aircrewman

The individual pilot or aircrewman is in the best position to insure the professional approach to post-holiday flying. He should assure himself that he is current in all procedures, in good physical condition, has an airworthy craft and has had a complete brief covering the entire flight prior to takeoff.

Summary

A coordinated effort by all hands to bridge the transition from holiday relaxation to a full flight schedule, whether billed as a back-in-the-saddle program or as an emphasis on the professional approach, will pay safety dividends not only during this period but in the months to come. ◄

ISLAND HOPPING

Frequently it is necessary to resort to the seaplane when island hopping in the WestPac area. Some of the islands have no useable airstrip so that seaplanes are the only aircraft one can use. The dependable HU-16 amphibian is used when one needs a hull instead of wheels.

A MESSAGE was received at a naval installation in one of the WestPac trust territories that a VIP group would be arriving and would need forwarding transportation to another, smaller naval activity. The ultimate destination could be reached by surface ship or by amphibian. Time precluded surface transportation; so the amphibian was assigned. Staging was necessary for the crew and plane.

The plan was to depart home base, await the VIP group at a second base and then transport them to their destination. The amphibian and crew took off during the dark hours of very early morning. (The flight crew satisfied any monthly flight requirements before they landed at the staging base.) While they waited the pilot reviewed and double checked their plans. They had a wait of about two hours. The transfer of the VIP group between planes was quick and orderly and the amphibian was airborne in less than 15 minutes and on its way for the two-hour flight to destination.

Weather at destination was about 700 ft overcast, with showers in the area. Visibility, except in showers, was good. The prevailing northeasterly wind was blowing about 15 kts. There was an inner and outer harbor at destination. The outer harbor had some pretty good wave action and both inner and outer harbors had one to two foot swells. The pilot wisely made a pass over the area, looked things over carefully and decided to land in the inner harbor. This idea was confirmed by the pilot in another plane that was accompanying them and which had landed first without any trouble. (Figure 1 depicts the northern, one-third part of the area selected for landing.)

The pilot, with the VIP group aboard, started a long final over an abandoned World War II fighter strip, set his flaps at 30 degrees and flew the plane into the protected area of the inner harbor. The first touchdown resulted in a skip. The plane did not bounce too high as a result of the skip but it did become airborne and was landed a second time. After the second landing the nose dug in and the plane swerved violently. This caused the nose wheel door compartment to fail and the hull lost its watertight integrity. The plane sank.

When motion stopped, which was fairly quick, the passengers in the rear of the plane were left pretty much to their own devices. The crew had exited forward and the passengers, after incurring some difficulty with

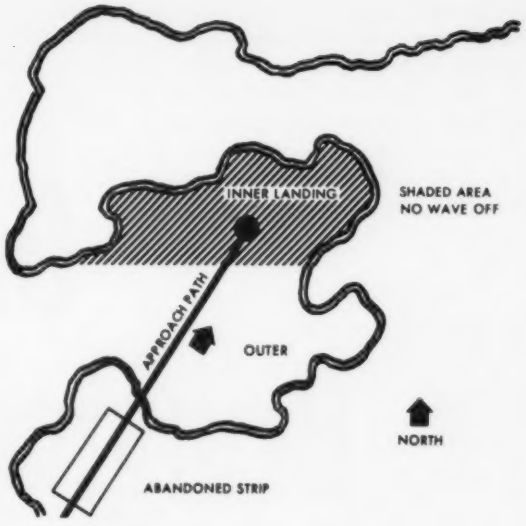


Fig. 1

opening the hatch, left by the rear passenger door. The rescue boat was a "mike" boat which had no ladder or any way by which a swimmer could climb in or be pulled in. An ARB boat finally arrived on the scene and picked everyone up.

The passengers had not received any brief on survival, emergency procedures or equipment usage. Every airline in the world takes time to brief. The crew of any aircraft carrying passengers must make it SOP to take time to brief the passengers. The investigating board brought this out vividly – "A standard briefing . . . . be given to all passengers with no deviations." Regardless of the passengers previous experience, a thorough brief must be given prior to each flight. Strangely enough the board did not comment on inadequate rescue facilities but seniors in the chain did!

On Bringing Up the Flight Instructor

Based on material submitted by LCDR L. A. ZAGORTZ, former ASO, VT-28

Shoot 'em down on the next pass!

THERE is a tape recording, kept at one place or another in the Basic Training Command, which purports to be a transcript of the radio communications which took place between a flight instructor and his four solo students on a formation practice flight.

It seems, as the story goes, that unbeknownst to this hapless instructor, just prior to takeoff, the four bonafide students are replaced by four very well qualified formation flight instructors. As the flight progresses, the "students" get increasingly out of hand, performing slow-rolls into position during join-up, etc. The instructor, unable to maintain even a semblance of order among his "students," finally gets them in the vicinity of home field where, after vainly trying to get them to effect a safe landing, pathetically pleads for the RDO to "shoot them down on the next pass."

We'll leave it to all pilots who have heard and enjoyed

the tape to decide whether it is what it purports to be. If this story is true, it is *the* classic example of putting the unaware flight instructor behind the 8-ball just to watch him squirm but it's certainly not the *only* example.

Hazing is an Occupational Hazard

Over the years there have been other, lesser pranks staged at the expense of one flight instructor or another.

Take the primary flight instructor who *earned* the sobriquet of "Down-Check Charlie." It was a rare flight student who could measure up to his stringent demands on the safe-for-solo flight check. The other flight instructors, no doubt feeling that he was in effect, casting doubt on their abilities as flight instructors, resolved to rectify the matter, or to at least obtain some satisfaction. Accordingly, they scheduled a newly arrived instructor (who also happened to be a highly proficient fleet pilot) for a safe-for-solo flight with Down-Check Charlie.

Sure enough, as the instructor and student returned from the flight, the instructor made the more-or-less usual thumbs-down gesture as he approached the schedules board – only to be greeted by a chorus of raucous cheers, jeers and catcalls from a horde of students and instructors who suddenly came out of the woodwork. When the "student" revealed his true status, the red-faced Down-Check Charlie was left talking to himself.

Hazing for Safety

No one can argue with the fact that instructors have traditionally suffered from a lot of leg-pulling by students and contemporaries alike. But these stunts have usually been for laughs.There is, however, a procedure which might be characterized as a first cousin to these stunts, which is practiced in some quarters for a much more worthy purpose. We speak of a type of check-ride given by some unit standardization instructors to prospective instructor pilots. This procedure also finds application, to a lesser extent, in transition training of designated aviators.

During the course of such a check-ride, the standardization instructor assumes the role of a student pilot or pilot undergoing transition and proceeds to behave in a highly unorthodox manner, performing one incorrect action after another in order to test the ability of the would-be instructor or transition pilot to detect errors and exercise proper judgment in taking timely corrective action. Such flights have often come to be termed as "idiot flights." It should be noted here that the term is used without malice, does not refer to any person, but rather is used to denote that small but certain propensity in all of us to occasionally goof.

The Idiot Flight

To illustrate what we mean, read the following narrative written by a training command standardization instructor:

"Most naval aviators fly airplanes rather well but are these same pilots necessarily qualified to instruct other pilots? Are they always able to detect procedural errors and catch potentially dangerous situations?

"Navy pilots being somewhat human do make errors in transition phases (and unfortunately at other times, too). Can a command's IPs catch these errors?

"We in the flight training business have an *idiot* flight for a prospective instructor (IUT) in which typical errors are intentionally introduced. The flight serves a threefold purpose:

- It checks the IUT's ability to detect procedural errors (pattern altitudes, cockpit procedures, etc.)
- It serves as a vehicle to see if the IUT can catch potentially dangerous situations (low airspeed, unbalanced flight, etc.), and
- It provides the IUT with exposure and confidence in detecting these errors.

"To conduct an *idiot* flight, take one highly-motivated, well-skilled standardization instructor and lock him in the left seat as the *idiot.* In the right seat, you strap in an IUT who is one flight away from his final check ride. The flight is programmed to include all the dumbbell antics that students, other IUTs (and even senior pilots) can reasonably be expected to pull during a tour.

"Safety of course, is paramount but other than that, it is 'no holds barred.' A typical flight goes like this:

"After much effort and labor, you get the engines started (after forgetting to turn on the fuel and failing to put the mixtures up), taxi (using excess power and

brakes on the same side), stumble through the engine turnup (feathering vice unfeathering, etc.) and the takeoff check-list (wrong trim or flaps). You then proceed to become airborne.

"The takeoff resembles a sine-wave form as the IUT tries to maintain his composure following the first differential power application. The climbout resembles a roller-coaster ride as the *idiot* tries his best to bust his simulated ATC clearance. With airspeed plus or minus 20 kts, the *idiot* levels off somewhere near his assigned altitude and promptly completes the post takeoff check-list, from memory, including mixtures to NORMAL. When the IUT subsequently calls for the check-list to be completed by challenge and reply, when it comes to mixtures, the No. 1 engine is promptly shutdown because the mixture is moved from NORMAL to IDLE CUT-OFF. The octo-flugeron that follows is a classic.

"Once back to assigned altitude with both engines running, the *idiot* distracts the IUT, quietly switches to approach control and advises them that the approach to follow will be out of the ballpark.

"By sneaking in reverse sensing, the *idiot* is able to take the IUT on an unscheduled cross-country in the vicinity of the navaid. Staggering back to the navaid, the IUT tries to contact approach control and of course, is promptly cutout by the *idiot* on the ICS.

"The track from the facility to the field comes close to an Oscar pattern and by now the field is completely missed. The IUT cannot believe that all this is really happening. The flight next proceeds to a bounce field to give the IUT experience in the landing pattern.

"An attempted wheels-up pass, forgetting props and a little dive for the deck with an S-turn takeoff usually causes the IUT to yell, 'I've got it.' Unfortunately, he hits the UHF button vice the ICS button and 14 other instructors quickly find themselves flying as their students promptly release the controls.

"The flight finally terminates at home plate and the IUT and the *idiot* shake hands over a cup of coffee, hopefully remaining friends.

"We do not claim to have orginated the *idiot* flight as it is being used by other units in the training command. However, it does provide the future instructor pilot with an opportunity for error detection and it helps prevent the common AAR statement, "This accident could have been prevented if the pilot had taken over sooner."

And there you have it – the *idiot* flight. This type of flight is certainly not uncommon in naval aviation. In fact, we believe most readers will agree that variations of it are widespread, not only in the training command, but throughout the Navy even though, in an operating unit, it may consist merely of having the standardization instructor on a check-ride, pull the navaid or attitude gyro circuit breaker, to simulate an emergency.

Are Idiot Flights Safe

The stated purpose of such flights is the improvement of safety. It, therefore, seems to be pertinent to ask, *are the flights, themselves, safe?* In considering the question we must note that the foregoing narrative of the typical flight is facetious to a point. That is, we don't take literally everything stated therein. Nevertheless, there's no doubt that it describes a flight where the standardization pilot tries to see if he can put something over on the prospective flight instructor. We believe this warrants some further discussion.

We repeat, are *idiot* flights safe? Do they violate NATOPS? Are they worthwhile? We could give you our opinion at once but this appears to be a subject capable of producing some real honest-to-goodness differences of opinion. We are therefore withholding our opinion in favor of encouraging discussion on the matter. By way of discussion, let's say you are *for* such flights. If so, it might be enlightening to consider the following accident brief:

• A highly-qualified F-11A pilot was being checked out in a T-33B aircraft by a standardization instuctor. The pilot under instruction was making an approach to a landing during gusty crosswind conditions. He commenced a flareout too high and just prior to touchdown, took out some of his left-wing-down crosswind correction in anticipation of imminent contact with the deck. At that moment, a gust of wind lifted his left wing and caused the right wing to drop. The right tip tank contacted the runway about 1200 ft from the approach end followed by the MLG, causing the aircraft to veer to the right. The standardization instructor took control of the aircraft, added 100 percent power and retracted the speed brakes but was

unable to keep the aircraft on the runway. It left the runway at a 20-degree angle with about 90 kts speed. The aircraft continued to accelerate, even though it was now in the grass and the standardization instructor resolved to try to get airborne again. After another 1800 ft of travel, parallel to the runway, the aircraft became safely airborne. The standardization instructor declared an emergency and effected an uneventful landing.

No doubt you may already be ticking off items illustrated by this accident brief which tend to support your *pro* position, e.g.:

- Pilots, even though experienced, are subject to error when transitioning to new aircraft. It follows that inexperienced, non-designated students might be even more subject to error in learning to fly.
- Instructor pilots, whether checking out student pilots or designated pilots, must be alert to recognize error and assume control of the aircraft in time to prevent an accident.
- The instructor pilot in the example above did assume control but only barely in time to prevent a serious accident, pointing up the need for training of instructors to recognize the point at which they must take control.

Continued

There is Another Side

Before you give such flights your unqualified support and blessing, it might be well to go over this incident one more time. Suppose for example, that the "student" in this case was not really a student but was actually a standardization instructor pretending to be a student. Suppose the "student" decided to *simulate* a dangerous landing situation in order to test the IUT (now playing the role of an instructor pilot) on his ability to detect said *simulated* dangerous situation and take control of the aircraft. Give the "student" credit for being such a skilled pilot that he intended (and did) stop the problem just short of the critical point. Now . . .

- Can we assume that the IUT (playing the instructor's role) *knew* the situation was still under control?
- Can we visualize the situation where the IUT *thought* the situation was out of hand and then proceeded to take control himself?
- If the IUT did take control, do you believe the "student" would *really* relinquish control, including his responsibility?
- If the "student" did not *really* relinquish control and through either a lack of skill on the part of the IUT or the vagaries of a passing gust of wind, the situation *really* did become critical – what would be the likely outcome?
- Can you now visualize a situation where one of the two pilots tries to effect a landing on that pass and the other pilot tries to take it around?

So much for the questions. Maybe you still think *idiot* flights are a good thing but you will have to agree that at least *this one* should have been preceded by one of the most carefully-phrased preflight briefs ever given.

Perhaps you would like to buttress the need for such flights by pointing out a few of the goofs that have been committed by students over the years. Allow us:

- Picking up gear on the landing rollout instead of flaps.
- Advancing power without first putting props up.
- Putting mixture to IDLE CUTOFF instead of NORMAL.
- Unconsciously feeding in rudder on approach causing a skidded turn stall.
- Setting a reciprocal in the course selector.
- Spilt-essing upon finding the aircraft upside down (laughable at altitude, but very dangerous down low).
- Feathering good engine.

These examples are not particularly outstanding. We could give more but the point is made. Every goof that can be made by an inexperienced student or transitioning naval aviator *may* occur on the next flight. The question is, is it worthwhile to expose aircraft and crews to the dangers inherent in realistically simulating these goofs? Or would it be better to concentrate on producing instructor pilots who are highly proficient in the principles of flight, in type aircraft and NATOPS emergency procedures, who are alert for any eventuality, and who through verbal instructions and study have become good students of human nature?

We are withholding further discussion on this subject until a future issue. We solicit the opinions of our readers on this subject; give us and other readers the benefit of your thoughts. Then be on the look out for a future issue which will contain a digest of opinions and a further discussion on this subject.

Comment

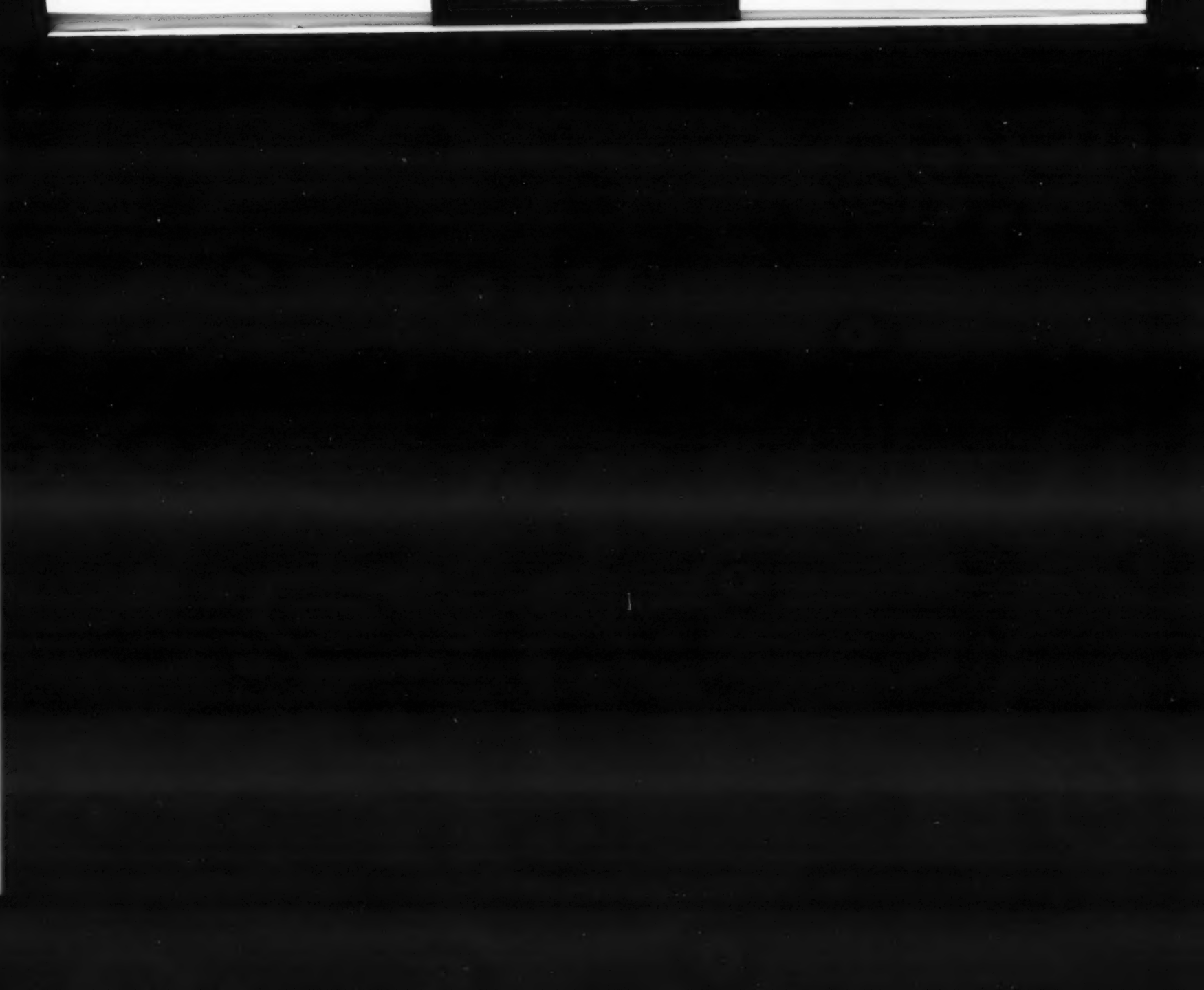
SIMULATED emergencies during training sequences have been responsible for many serious accidents to aircraft, both large and small. Paradoxically, this is especially true of training sequences in which the trainee concerned is already an experienced and competent pilot, even if inexperienced in the type being flown at the time.

In circumstances such as these, there seems to be a tendency to place too much reliance in the trainee's judgment and ability to cope with unfamiliar emergency situations. This danger is obviously compounded if, as well as being highly experienced, the trainee is a senior person whose rank or status is equal to or greater than that of the pilot responsible for the training. Human nature being what it is, it is hard to resist allowing such a trainee more latitude than would be given a junior, less experienced pilot under training.

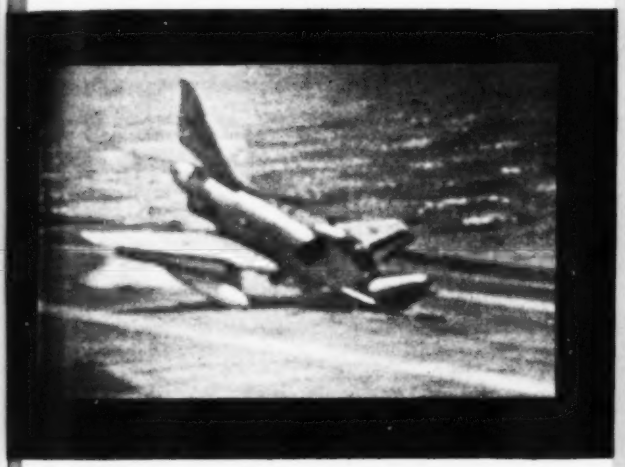
Apart from this latter aspect, training accidents have too often shown that where such a relationship exists between two pilots, and both are designated aviators, the responsibility for the safety of the aircraft, during a particular training sequence, is not always clearly defined, and as a result, a potentially dangerous situation exists.

The heat of the moment when an actual emergency arises is hardly the time for determining who has this responsibility. In any training exercise, unless there is a perfectly clear distinction in pilot status, (such as an instructor/student or captain/copilot relationship) it is essential that, for each exercise, there is a quite positive mutual understanding as to who will be responsible for the safety of the aircraft, in the event of an emergency.

Australian Aviation Safety Digest



Inflight



Engagement

JET CARRIER approaches leave little margin for error, especially at night, and demand a high degree of precise aircraft control. Ramp strikes continue to be a major problem in carrier operations. The July 1966 issue of *Approach* carried a comprehensive article on ramp strikes. While the yearly average is not steady, it is seldom less than 20 and more often above 30. Every year a few ramp strike potential incidents are turned into accidents because of subsequent inflight engagments. Herewith narrated is one such occurrence.

After concluding not the best of day carquals, an A-4E pilot was catapulted in the twilight for bounce. The first approach by the *Skyhawk* to the carrier was waved off for being poorly lined up, fast and high. On the second attempt, things got off again to a bad start when the pilot was late in commencing the proper rate of descent. In the middle of the approach, the pilot was still high and drifting to port. He was aware of the imperfections and attempted to get on the money by reducing power and altering course slightly to starboard. This effort brought him back to the normal line-up and altitude but he did not move fast enough to make it hold steady because he slipped below glidepath.

He sensed the need for more thrust simultaneously with hearing the LSO call "power" and then aggravated the situation by overcontrolling. The A-4 was at military power when the pilot observed the ball and waveoff lights at the same time. A second later he rotated for the waveoff and closed the speed brakes but it was too late to prevent a ramp strike. Since the right wing had dropped a moment before contact, the right MLG absorbed most of the impact. An instant later the left tire struck the deck and the tail hook bounced off the round-down.

All of the energy was transposed into bouncing the aircraft back into the air assisted by the engine turning at full MRT. Skimming over the deck the left wing then went slightly low when the hook grabbed the No. 1 crossdeck pendant. The violent arrestment slammed the *Skyhawk* hard to the deck. The nose gear sheared sideways and aft due to the left drift which also contributed to damaging the port MLG. Then the nose impacted the deck with such magnitude that the radome latches broke loose tipping up the nose section. When stopped, the A-4E looked pretty sad on its turned-up nose, port drop tank and sprung MLG. Strangely enough, none of the three tires blew out.

No fire ensued and the pilot got out unharmed. The pilot got most of the blame for poor approach technique; however, the LSO was considered to have been slow in flicking the mandatory waveoff. This type of carrier incident/accident is a major concern in the Navy and everyone should double their efforts to eliminate it. ◄

"This tragedy has its roots in what is believed to be the most ancient chronicle of aviation, the Greek myth of Daedalus and Icarus. The pilot, possessed of the same boyish exuberance as Icarus, chose to disdain the counsel and guidance of his elders."

Why?

Thus wrote the commanding officer in his endorsement to the accident investigation involving a young student pilot who tried, in a manner of speaking, to fly too high.

THE sun comes up early and hot in late May. Our student rolled out of bed, raised the window shade and looked at the sunrise . . . it was the last one he would see.

He breakfasted on eggs and muffins, shaved, dressed and hopped the bus for the squadron area. Shortly after 0800 he briefed for and took off on a FMLP hop. Less than an hour later he was back on the ground debriefing and preparing for the next flight which would terminate at home base.

Above Average

At this point let us review the pilot's background as a student naval aviator. His progress through the primary phase of flight training was above average with a numerical grade average of 3.07. He requested and was accepted for jet training. His progress through basic jet training was, again, above average with a 3.06 numerical grade average.

Throughout the flight phases of his training he did not exhibit any dangerous tendencies and his performance was borne out by the routine psychological testing given all students during early stages of training. Yet, this student would shortly perform an unauthorized maneuver, perhaps acting on impulse, which would exact the maximum penalty . . . death!

The Trip Home

Following the debrief the students manned their T-2Bs, completed the next FMLP hop, then departed the OLF as a five plane flight. Flying in the No. 4 position our student proceeded to follow the prescribed route back to the home base. This route took the flight slightly south of a beach area then paralleled it for several miles before turning in to enter the traffic pattern of home base. There were low clouds with bases estimated to be between 1000 and 1500 ft along the proposed route of flight. As the aircraft departed the

The T-2B stalled, got into a nose-low attitude and spiralled down to the left into the water.


NAVY

outlying field at 45 second intervals, the student pilots related later that they were unable to remain VFR at the prescribed altitude so each one chose the best altitude to remain clear of the clouds and proceeded to fly the route to home base. None of the students in the flight reported seeing No. 4 aircraft after he departed the outlying field.

The Last Maneuver

Shortly after all the aircraft departed for home base a privately owned *Cessna 177* with two passengers aboard was cruising south of the beach line returning to the local municipal airport. The passengers in the private aircraft were engaged in photographing the beach area for the Department of Agriculture.

The pilot of the *Cessna* stated, "There were about three or four jet aircraft leaving the Navy installation (OLF) going along the coast so I was very alert to keep outside of these aircraft. I was at an altitude of 800 ft and a jet trainer, known as a T-2B, came under me at an altitude of about 500 ft. He paralled my position and flew east-bound until he got about 1000 to 2000 ft ahead of me at my one o'clock position. From my best estimation his altitude was about 500 ft at this time.

"He then began a slow roll or a barrel roll, whichever you determine to call it, to the right. He made a slow roll to the right and upon recovery or upon trying to effect recovery from this slow roll, came out at a very nose-high attitude and appeared to stall the airplane."

As the board concluded later, "By selecting to roll to the right, the pilot, when having completed 270 degrees of roll and using top rudder to maintain a nose attitude, deprived himself of the stall warning system in the aircraft by blanking the airstream over the angle of attack probe."

The pilot of the *Cessna* continues his statement, "The airplane in my estimation did stall and go into a very nose-low attitude and spiralled down and to the left into the water."

The *Cessna* pilot promptly notified the nearest FAA facility that he had witnessed an aircraft crash into the water and he remained on the scene until military aircraft arrived to conduct search and rescue operations.

Looking Back

Subsequent investigation revealed that the aircraft had impacted the water at a high rate of descent, approximately 20 degrees nose-down, 20 degrees left wing down and with an impact angle of approximately 45 degrees to the water's surface. The ejection seat system was not initiated! No evidence of structural failure inflight was in evidence and it was concluded by analysis that there was no power plant malfunction.

The board concluded that the primary cause of the accident was an attempt by the student naval aviator to perform an unauthorized flight maneuver in direct violation of air discipline, NATOPS and squadron procedures.

We can ask ourselves a rather searching question at this point. How often have we felt the degree of confidence that prompted us to think, "I could do anything with this bird"? There have been times when all aviators have had that feeling. No matter what the task at hand, or maneuver contemplated, we have had the feeling that we could do it. Our student must certainly have had some feeling of confidence, perhaps associated with a certain elation at having successfully completed another FMLP hop, which clouded his judgment. All aviators have some element of the showman in them, i.e. the justifiable desire to demonstrate ones skill – whether it be in some acrobatic maneuver or simply a smooth landing; and this student pilot was no different than the rest of us in that respect. What failed him in his time of need was his skill and clearly skill was required to pull off a slow roll at 500 ft.

Why

Why did this happen to an above average student? Had he survived, the student probably could not have explained his own actions. This much is certain, he flew too high, as did Icarus on his fateful solo in the sense that he exceeded his capability as an aviator and ignored his training, and he fell into the sea. The epitaph is not unique but it illustrates well the premise that history repeats itself. Don't help history repeat itself – let us hear from you, not about you.

To get maximum attention,
its hard to beat a good, big mistake.

Hanover, N.H. Gazette

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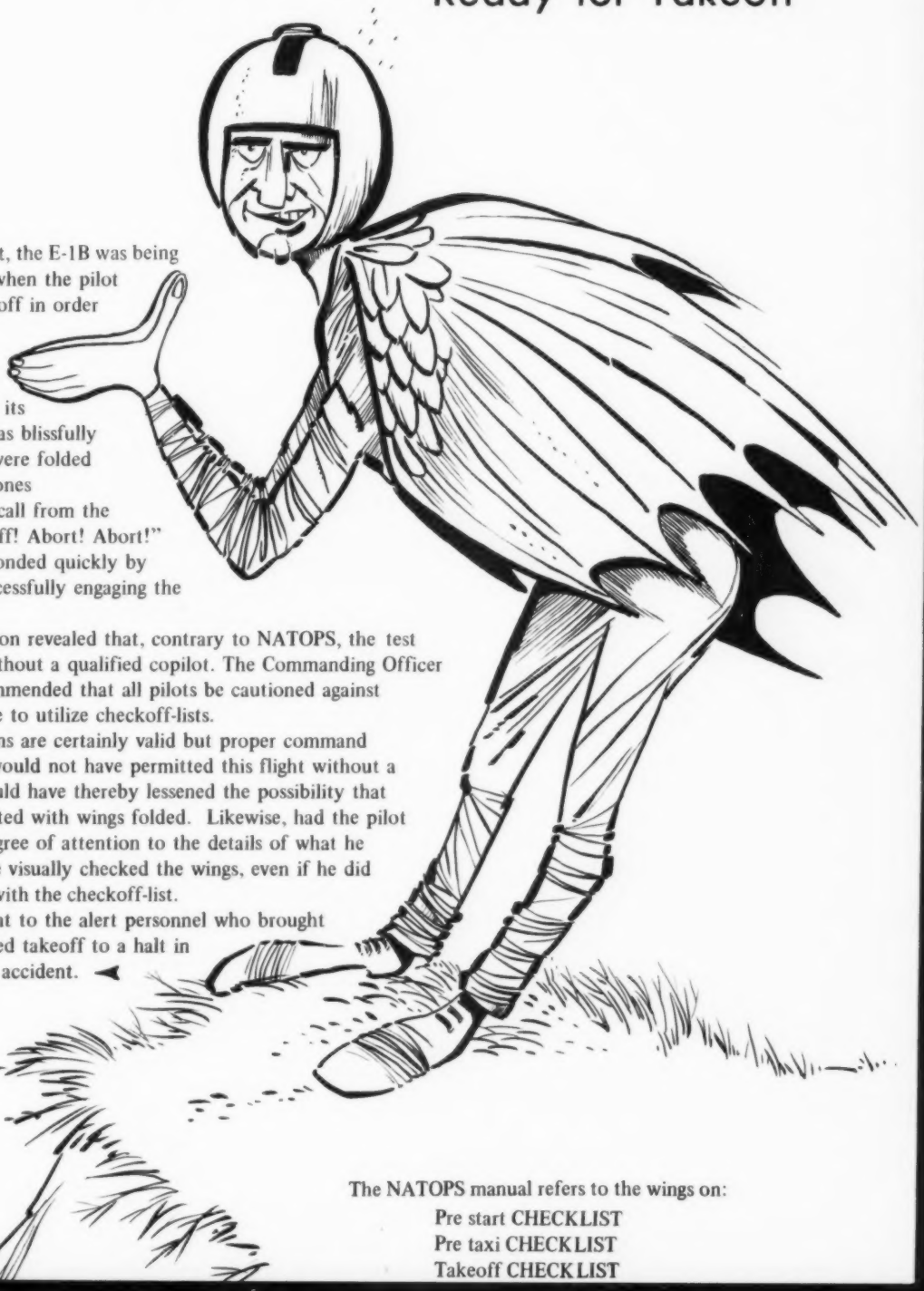
Head up and Locked
Ready for Takeoff



FOLLOWING a test flight, the E-1B was being taxied back to the line when the pilot decided on another takeoff in order to check an item more thoroughly.

The E-IB accelerated rapidly as it commenced its takeoff roll. The pilot was blissfully unaware that his wings were folded until suddenly his earphones communicated a frantic call from the tower, "Stop your takeoff! Abort! Abort!" The now alert pilot responded quickly by chopping power and successfully engaging the arresting gear.

Subsequent investigation revealed that, contrary to NATOPS, the test flight had been flown without a qualified copilot. The Commanding Officer in his endorsement recommended that all pilots be cautioned against preoccupation and failure to utilize checkoff-lists.

These recommendations are certainly valid but proper command attention to scheduling would not have permitted this flight without a qualified copilot and would have thereby lessened the possibility that takeoff would be attempted with wings folded. Likewise, had the pilot displayed even a mild degree of attention to the details of what he was about, he would have visually checked the wings, even if he did not want to be bothered with the checkoff-list.

Finally, a tip of the hat to the alert personnel who brought the attempted wings-folded takeoff to a halt in time to prevent a serious accident. ◄

The NATOPS manual refers to the wings on:

Pre start CHECKLIST
Pre taxi CHECKLIST
Takeoff CHECKLIST

Friendly 'Enemy' Confusion

AIR combat tactics are designed to teach pilots the best, safest and quickest ways to destroy airborne enemy aircraft. Using machine guns (or cannons), positions of close proximity (1000 ft) must be obtained to achieve maximum destructive weapons efficiency. This distance can be extended out to about three miles with current operational air-to-air missiles.

The danger of collision while practicing air-to-air tactics is always present. These risks are multiplied by the airspeeds of the individual aircraft and their close proximity to each other. It does not take many aircraft in the same piece of sky to create a dangerously confusing situation.

An A-4B squadron scheduled air combat tactics. A division of *Skyhawks* was briefed to fly in combat cruise to simulate an escort mission. A fifth A-4B was to be the simulated enemy attacker. After several maneuvers, Nos. 1 and 2 became separated from each other as well as from the other section. The "enemy" plane pulled up to FL 225 and waited while the other A-4s attempted to get back together.

Number 3 (the second section leader) suddenly caught sight of No. 2 whom he immediately assumed to be the enemy. Consequently, he initiated a steep left turn and attacked. The real "enemy" pilot decided to take advantage of the confusion so he dove down and made a port side attack on No. 4. After several scissors maneuvers, the "enemy" theoretically destroyed No. 4, then moved up to boresight No. 3. A few seconds later, the "enemy" decided to shift his aim to the lead plane (No. 2 who was still thought to be the "enemy" by Nos. 3 and 4). To do this he increased his speed and pulled up slightly high on the port side of No. 3, while concentrating on boresighting No. 2. When the "enemy" glanced to his right to keep track of No. 3, he could not locate him. Meanwhile No. 3 was crossing under the "enemy" aircraft, right to left. Fearing that No. 3 might be dangerously close, the "enemy" pulled up and rolled hard to the left. This caught No. 3 by surprise because he was initiating a right climbing turn to get behind the "enemy." Unfortunately, the maneuvers were executed in the blind and the two *Skyhawks* collided. Immediately thereafter, the two aircraft separated and fell out of control. Both pilots ejected successfully.

The history of aviation is replete with such accidents/incidents during practice not to mention the unknown actual combat accidental collisions between friend and friend or friend and foe. Extreme caution should always be the key word in combat tactics. Brief the hop and fly the hop as briefed. ◄

Several of our pilots involved in ferry flights have noticed that most line personnel at the bases where they stop are not familiar with safety precautions in handling helicopters. This includes Air Force and Navy bases, mostly Navy. The most obvious precaution frequently violated is line personnel walking under the blade path during engagement and disengagement of rotors. Until the droop stops are engaged and the blades brought to a stop this is dangerous. Droop stop failure or gusty winds can easily bring a blade down to shoulder level, or lower. – *HC ASO*

HELICOPTER LINE SAFETY

THE ANYMOUSE quoted above was a reminder that it is time for an article on helicopter line safety. Back when helicopter operations ashore and afloat were new (early 1950s) and kind of a novelty, adherence to safety procedures was universal. For example no one walked under rotor blades while they were in motion and onlookers kept their distance while choppers launched and landed. However, the passage of time and the increased tempo of operations have perhaps dulled the senses of the ever and always present dangers of helicopter operations.

An excellent source for line safety in helicopter operations is NWIP 41-6(C), just reissued 5 June 1968, which is titled "Non Aviation Ship Helicopter Operations." In the first part of this publication is the following charge . . . . "Commanding Officers shall ensure that key personnel are familiar with helicopter operations." The paragraph on limitations (121) provides general information common to all choppers. Included is a brief statement on lift, center of gravity and blade flapping. In the latter category personnel are cautioned about the hazards of engagement and disengagement of rotor systems in high winds and/or turbulent conditions. "Experience has shown that the probability of damage increases when winds gust in excess of 15 kts." Other safety precautions include ensuring that individuals not engaged in flight operations are not in the immediate vicinity of the operating area.

Another safety precaution spelled out is to secure all loose objects prior to helicopter operations. Chapter 7 Safety Considerations, promulgates general safety precautions and includes information on the following:

- Blade flapping which can occur at any time
- Engines and FOD
- Chocks and tie downs as applicable
- Parking restrictions in close proximity to other objects
- Tipping tendency prior to takeoff

The following chart describes clearances of some of the most common Navy helicopters. ◄

Model	Length Including Tail Rotor	Minimum Height Main Rotor	Height Tail Rotor
H-1	53'	6'8"	5'4"
H-2	52'6"	8'4"	6'4"
H-3	72'6"	9'1"	6'8"
H-13	43'4"	9'6"	3'1"
H-19	59'	8'11"	6'3"
H-34	65'10"	9'8"	6'5"
H-46	83'4"	9'7"	14'5"
H-53	88'1"	10'4"	8'11"

ON THE GLIDE SLOPE

This month we feature some of the questions most often asked by our readers who are seeking the

Answers from Aggie

If *you* have a question concerning any phase of instrument flight for which you cannot find a satisfactory answer, send it to the Commanding Officer, VA-127, NAS Lemoore, Calif. 93245, who has volunteered to do the necessary research and supply the answers.

Question: My aircraft is TACAN equipped only. May I shoot a VOR approach from a VORTAC facility utilizing the TACAN equipment in my aircraft?

Answer: No, you may not shoot a VOR approach utilizing your TACAN-equipped-only aircraft. If TACAN equipment may be used, the approach identification should read "TACAN RWY (number stated)" or "TACAN 1". Under the TERPS criteria, paragraph 500, an instrument approach utilizing a VORTAC facility and permitting the use of either VOR/DME or TACAN equipment should be identified as "VORTAC" approach procedure. There are three constraints which may restict the free interchange of VOR or TACAN equipment. They are: (1) The procedure may not have been flight checked for the type of gear in your aircraft; (2) The procedure may be based on distance measuring capability; and, (3) VOR procedures may be premised on overheading the VOR when commencing the final approach segment. TACAN or VORTAC facilities are not used as the beginning point of the final approach segment because of the TACAN unlock condition which may occur.

Question: When a pilot has been issued an expected approach clearance (EAC) time, should he plan to be at the holding fix or the initial approach fix (IAF) at the EAC? (Example: Whidbey Island NAS.)

Answer: For (TACAN) holding patterns where the IAF is not within the confines of the holding pattern, the aircraft should maneuver to be at the holding fix on the EAC time. If the IAF is located within the published holding pattern, the aircraft should be at the IAF on the EAC time.

Question: What is a good rule of thumb to use for quickly determining turning radius?

Answer: For a 1/2 SRT, use the one percent rule: (Example, GS=45OK, TR=4.5 mi.) For a SRT, use 1/2 of one percent for the computation.

Question: When a GCA controller uses the terminology "REDUCE TO APPROACH SPEED," is this incumbent upon the pilot to slow the aircraft to approach speed?

Answer: The phraseology REDUCE TO APPROACH SPEED is sometimes used by radar air traffic controllers as a means of insuring separation between two aircraft in an approach area. Pilots should comply with this request whenever practicable; however, the final decision whether or not to reduce speed rests with the pilot who must consider performance capability, applicable aircraft operating manuals and existing flight conditions. The pilot should advise the controller if impractical to comply with his request to REDUCE TO APPROACH SPEED in order that he can take an alternate course of action. (Approach speed is the minimum speed consistent with safety for that portion of the approach being flown.)

Question: What is the proper procedure to follow in the event of lost communications during an ENROUTE DESCENT? *(Terminal Situation)*

Answer: If lost communications instructions were issued by the controller prior to the failure, comply with the instructions. Instructions are normally given to execute some published instrument approach to the airport which includes clearance to commence from the initial approach altitude. In the absence of lost communications instructions, the pilot should climb to the minimum safe or emergency safe altitude published on the approach plate and execute the approach from that altitude.

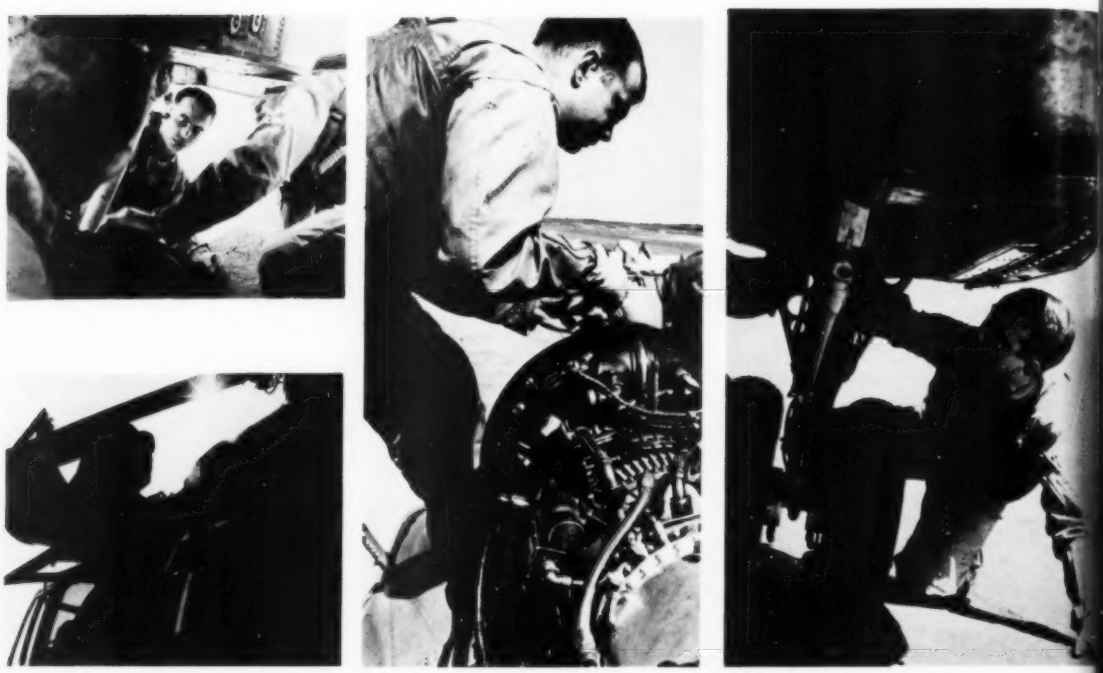
Question: A pilot, while inbound to the initial approach fix, receives clearance for the approach. Does this clearance constitute clearance to descend from the enroute assigned altitude to the published initial approach altitude? Also, if the aircraft arrives at the initial approach fix at a higher altitude than the published initial approach altitude, can the pilot commence the approach from the higher altitude?

Answer: The answer to the first question is YES. A descent may be commenced immediately upon receiving clearance for the approach unless otherwise cleared by ATC. As to commencing the approach from the initial approach fix at a higher altitude than published, the pilot may do this provided he can safely execute the approach to the final approach fix in accordance with the established speed and rate of descent criteria for the aircraft and the approach procedure does not specify a maximum altitude or crossing altitude. However, it must be remembered that the maximum speed below 10,000 ft MSL is 250 KIAS. ◄

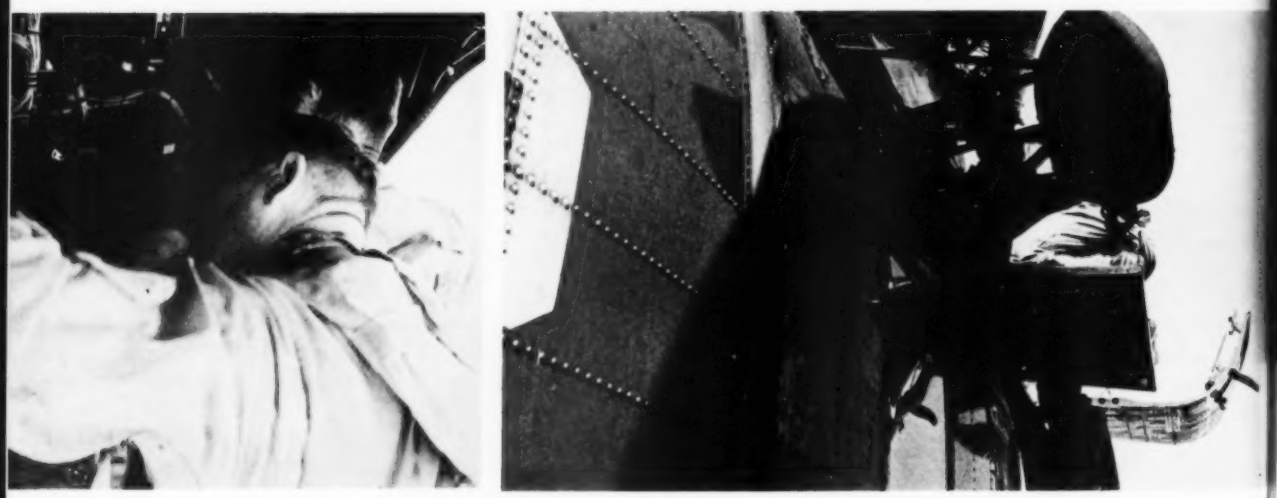
PASS IT ALONG!

Each copy of APPROACH is meant for ten readers.

PREFLIGHT



The responsibility for safe conduct of a flight includes inspection of the aircraft on the ground.



A thorough check of engine and electronic systems can prevent a mission abort.

T...

To check, test and prepare for use an aircraft, prior to a flight.

Adherence to NATOPS procedures during engine checks and in flight ensure safe and efficient operation.

... it's the only way to fly

It's all the same, you're ready for

The Cold Treatment

SOMEBODY has said that without treatment the common cold runs its course in seven days and that with treatment it runs its course in one week. Rest, aspirin and lots of sympathy are still about the best the medics can prescribe. (Old Chinese proverb: He who can cure common cold can spend rest of days counting shekels.)

While your bookkeeper neighbor may be able to carry on his business when he has a beaut of a cold, for pilots and aircrewmen it's another story entirely. A cold carried to altitude can do several dangerous things:

1) It can cause inflammation of the middle ear or an ear block. This can, in turn, cause pressure vertigo during rapid changes of altitude and can also result in rupture of the eardrum.

2) It can cause painful, even disabling, sinus block.

In addition, colds most certainly adversely affect your level of awareness and performance – a fact of life which maintenance, tower and other ground types should take under advisement. Furthermore, chances are that if you have a cold, you are trying just about every cure anybody recommends. This kind of self-medication can lead to all kinds of difficulties, some of which we'll get to later.

ow do you get a cold in the first place?

he common cold is thought to be caused pri arily by a virus which is passed from person to pe on by direct or indirect contact. You borrow so ebody's coffee cup or someone sneezes on you in Mi mar and a day or so later, you may develop the gra ddaddy of all colds in Pensacola or wherever you are

After you pick up the virus, bacteria which are normally present in your upper respiratory tract become, as the doctors say, pathogenic – that is, they start causing trouble. Catching the virus by direct or indirect contact is the most important predisposing factor in the development of a cold. Secondary factors include chilling, fatigue, damp clothes, poor ventilation and central heating with dry air.

The usual course of a cold is the well-known dry nose for 24 hours; wet, runny, stuffy nose for three to four days; yellow-discharging nose for three to four days, followed by a tapering off. The miseries and fever usually come with the wet, runny stage.

If symptoms persist after the cold itself subsides, you may have complicating sinus or ear infection or a chest infection. If you haven't already checked in with your flight surgeon, now is most assuredly the time. Antibiotics have no effect on the common virus cold described above but if you are running a fever indicating a bacterial infection at this stage, your flight surgeon may prescribe an antibiotic.

Ear Trouble

Colds are the source of a great deal of ear trouble. Congestion from a cold can close the Eustachian tubes which normally equalize pressure in the middle ear. Only a slight amount of congestion is required. Blowing your nose hard can force infected material into the Eustachian tube itself. After the tube is closed, air in the middle ear is absorbed. Your ears feel stuffy and you have pain and loss of hearing – sounds become distant and less intense. If infection follows, the middle ear cavity fills with pus. If you still let it go untreated, the eardrum can rupture and pus drains into the external ear canal. Rupture of the eardrum occasionally occurs during flight. When the eardrum ruptures, the victim suffers excruciating pain associated with a loud explosive noise in the ear. Vertigo and nausea become marked and shock and general collapse may follow.

Aerotitis Media

The term "aerotitis media" used by your friendly flight surgeon designates an acute or chronic traumatic inflammation of the middle ear caused by an atmospheric pressure greater than the pressure in the middle ear. The vast majority of these cases occur among pilots and aircrewmen who fly in spite of the fact they have acute colds. Aerotitis media causes pain, temporary deafness, tinnitus or ear noises and can cause pressure vertigo.

To maintain equal pressure on the inside and outside of the tympanic membrane or eardrum, there must be ready interchange of air between the middle ear and the external air. During ascent, the air in your middle ear expands and you have a slight sensation of fullness. With an increase in altitude of 500 ft from sea level, normally the Eustachian tube is forced open by excess pressure. There will be a "click" in the middle ear and the pressure will equalize. If your Eustachian tubes are swollen because of a cold, this cannot take place.

On descent from altitude, the pharyngeal or throat end of the Eustachian tube acts as a flutter valve and keeps air from entering.

The symptoms caused by ear block are more marked during descent than during ascent because the pressure in the middle ear is not relieved by its own force. You have a sensation of fullness with severe pain and ear noises and, in many cases, vertigo with nausea. If the pressure differential is not relieved and continues to increase, the eardrum finally ruptures. Pain subsides but a dull earache persists for 12 to 48 hours with distinctly diminished hearing. Vertigo and nausea may last from 6 to 24 hours.

To equalize pressure in the middle ear while descending, you must remember to swallow, yawn or perform Valsalva maneuver (hold your nose, close your mouth and blow). Ascending to higher altitude will reduce the external pressure; the subsequent descent should be gradual as possible to allow

pressure to equalize.

Oxygen Otitis Media

Another form of acute aerotitis media should be mentioned here although it is not due to changes of altitude and atmospheric pressure. When a pilot or aircrewman has been flying at altitude for some time on 100 percent oxygen, the air in the middle ear is replaced, in part, by 100 percent oxygen. While descending, in equalizing middle ear pressure, you replace any remaining air with more pure oxygen. At the end of the flight, the pressure in your middle ear is equalized with the atmospheric pressure but your middle ear is filled with 100 percent oxygen. If you then go to sleep so that normal yawning and swallowing movements do not occur to replace the 100 percent oxygen with ambient air, the oxygen will be absorbed in your bloodstream in rather short order, leaving a moderate to severe vacuum in your middle ear. The prevention for this kind of earache is simply to swallow, yawn and perform the Valsalva maneuver several times after descent so that the oxygen in your middle ear is replaced by air.

Sinus Block

Sinus blocks usually occur during descent. When your frontal sinuses are involved, the pain will be in your forehead, usually over your eyes. When it's your maxillary sinuses, the pain will be in your cheekbones below your eyes. These sinuses are comparatively large air spaces connecting with the nasal cavity by very small openings; only a slight amount of congestion is required to close them off. When this happens, negative pressure increases inside the cavity. First you have discomfort, then severe pain.

Steady breathing of very dry 100 percent oxygen can also make the problem worse by altering the nasal physiology, an effect most noticeable at the end of a flight at the very time when sinus block is most likely to occur.

The pain of a sinus block can be so bad that the pilot may consider it unwise to attempt a landing, especially aboard ship. A return to higher altitude, if possible, can bring relief. Many flight surgeons recommend that pilots and aircrewmen carry an approved inhaler containing a mild nasal vasoconstrictor specifically for use in such emergencies. Within a short time, use of the inhaler usually produces sufficient decrease in nasal and Eustachian swelling for pressure to be equalized and a successful landing can be made. Immediately after landing, the pilot or aircrewman should report to his flight surgeon.

Self-Medication

Using an approved inhaler in an inflight emergency is one thing. Self-medication with commercial cold remedies and allergy remedies and then flying is quite another. (Incidentally, allergy can set the stage for sinus and ear block so take your allergy problems to your flight surgeon.)

Compounds containing antihistamines are particularly dangerous to flyers. They can cause drowsiness, dizziness, dry mouth, headache, nausea and muscular twitching. The drowsiness can be a special hazard – it may not be recognized by the person taking the antihistamine because it may recur after seeming alertness.

Your squadron flight surgeon can describe and explain the effects of various cold remedies to you in detail. If you have any question about any particular medication, he's the man to see.

Prevention of Colds

When you get right down to it, the advice of the oldfashioned horse and buggy family doctor on the prevention of colds still makes good sense. Eat the right foods, get plenty of sleep and exercise and keep up your resistance. If you still can't beat the odds and some evil companion from the Coast comes in and spreads a cold throughout the squadron or office and you come down with it, do just that – come down with it – down yourself and don't fly. ◄

THE TF-9J pilot was briefed on an out-of-check test

PILOT RESPONSIBILITY

When you sign the yellow sheet, it's your bird. Preflight and fly it just like you owned it.

THE TF-9J pilot was briefed on an out-of-check test hop. He preflighted and started the aircraft normally but after start, canopy problems were discovered which necessitated that the port side access door be opened by a troubleshooter.

After the canopy problem was corrected, the pilot taxied to the runway and took off. As the aircraft accelerated to 300 kts, a loud banging noise was heard. The pilot immediately turned downwind and effected an overweight but otherwise uneventful landing.

Investigation revealed that the port access door either was not closed at all or had not been properly latched closed prior to takeoff. The C.O., commenting on the incident stated:

"It is the pilot's responsibility to ensure that his aircraft is ready for flight. When poststart work is performed on the aircraft by line personnel, the pilot is not thereby relieved of his responsibility, even if it requires shutting down the engine and leaving the cockpit to perform another inspection."

One might feel sympathetic toward this particular pilot but it is certainly hard to argue with the C.O.'s assessment of the pilot's responsibility. Responsibility – that's the key word! When the pilot signs the yellow sheet he thereby assumes responsibility for the aircraft. He may thereafter decide to accept the assistance of the plane captain and other line personnel or troubleshooters but whether he passively accepts their assistance or actively delegates authority to perform certain functions in and around the aircraft, he still retains the responsibility. In order to properly fulfill this responsibility, the pilot must assume the initiative and maintain direction over the events during the preflight and pre-takeoff checks. Another recent incident emphatically drives home this point:

During the left engine start in an A-6A, a wet start was noted by a lineman (an assistant plane captain) who signalled the plane captain to have the pilot secure the engine. As the pilot started to secure the engine, the lineman climbed the boarding ladder and as the pilot watched, pushed in the left ignition circuit breaker which had popped. As he did so, the left engine lit off. The lineman then noted flames coming from the left engine tailpipe and signalled the pilot to cut the engine. The pilot, whose attention had been diverted by the actions of the lineman, then looked back at his engine instruments and noted the left EGT passing 600 degrees. He immediately secured the engine.

When you sign the yellow sheet, it's your bird – and it's your responsibility to ensure that all operations involving the aircraft are performed in a safe, coordinated manner.

APRIL EVENING

DURING night carquals things got worse in the EKA-3B as it did three uncontrollable snap rolls before – thanks to the pilot's skill – things got better. After he salvaged the situation on the third roll, the aircraft scooped out at 400 to 500 ft and climbed steeply. However, he landed minus one crewman. His E/N (ECM/Navigator) had bailed out at 3000 ft and was eventually rescued by a plane guard helicopter.

The happy hour sea story of this incident will probably become a classic. For a starter, the following account, based on investigators' findings, will give you a pretty good idea of how it was . . . .

As the aircraft began its second roll at a much faster rate in spite of the pilot's countermeasures, he broadcast on UHF, "We're out of control! We're out of control! Bail out!" Then as he succeeded in regaining control and the rotation stopped, he cancelled the bailout order. At this point, however, the E/N who had already disconnected his communications plugs was on his way.

The third crewmember of the crew, the E/O (ECM/Operator) did not hear the bailout order although he did hear the first part of the transmission. (He was experiencing a ringing sensation in his left ear which had been giving him trouble in the bounce pattern.) Turning around in his rear-facing seat to see what was going on, he saw the E/N unfasten his seat belt, get up and blow the overhead hatch. The E/N stated later that he blew the upper hatch because he was momentarily unsure of the location of the lower hatch handle and he felt exiting from the upper hatch would be more advantageous at their low altitude.

"The hatch blew open and the E/N was turning around and about to go out," the E/O states, "when I heard the pilot say 'Stay!' I grabbed the E/N and tried to hold him in but there was no holding him – he was going out!"

(And just to demonstrate that everything is relative and it's all in your point of view, here's the E/N's statement on this event: "With the help of the third seat man I was able to lift myself up and grasp the upper hatch.")

The E/N used his elbows to hoist himself partially out of the cockpit and the airstream pulled him the rest of the way out. As he sailed back over the top of the fuselage, he was apparently facing aft. He hit the starboard side of the vertical stabilizer in a glancing blow absorbed mostly by his right hip and thigh. His flight boot scuffed along from forward of the horizontal stabilizer up to and over its leading edge.

"A split second after I left the cockpit I felt a bump on my right thigh, then I was clear of the aircraft and falling," he stated later. "As my baro-release lanyard was not connected, I pulled the D-ring – no difficulty – and observed a good chute. The moon was bright enough to allow me to see the horizon and I glanced momentarily at the water to estimate my altitude. I checked the accessibility of my koch fittings and Mk-3C toggles and quickly reviewed what I had learned at deep water survival school a month or so earlier."

When the parachute began to oscillate he attempted to stop it but with no success. The oscillation didn't seem serious so he prepared for the landing by inflating the right side of his Mk-3C. He put his hands on the koch fittings and lifted the upper part of the latch. *About 200 ft above the water he inadvertently disconnected the left koch fitting and the rest of the descent was made with only the right riser connected to the parachute.*

"When I hit the water, I pulled the starboard koch fitting and was immediately disengaged from the chute. As soon as I broke the surface, I inflated the left side of my Mk-3C and, spotting a helo on the horizon, activated my most easily accessible signaling device – the strobe light."

The E/N's troubles still weren't entirely over. After igniting the night end of a signal flare, he saw the helo disappear over the horizon. No other aircraft were in sight. He then realized that he had not deployed his raft during parachute descent and that the seat pan and parachute container were still attached to him by the lower rocket jet fitting. He released one leg strap and attempted to remove the raft.

"I had great difficulty locating the raft release and finally unzipped one side of the seat pack and forced the raft out," he recalls. "It must have taken me 5 to 7 minutes to accomplish this. My progress was hampered by the imbalance caused by the weight of the seat pack and back pack."

As soon as he got the raft out, he connected the lanyard to his Mk-3C and inflated it, deployed the sea anchor and boarded the raft. He readied another day/night signal flare for easy accessibility and fired a pencil flare in case a ship might be close enough to see it.

"I felt calm enough," he recalls, "but was apprehensive about being swept out to sea and concerned about the safety of the other two crewmembers."

He was rescued by plane guard helo after a half hour in the water.

Meanwhile the pilot had regained control and flown the A-3 to the beach.

"Once we got squared away on the outbound heading it took great physical pressure to hold the aircraft upright at all times," he states. "Not only that – but I had to think about what had happened and get the rescue vehicles to pick up the other crewman . . . We were at 16,000 ft at night with the wind rushing into the cockpit at up to 300 kts. I was completely drenched in sweat from trying to physically hold the aircraft. At no time did I ever feel cold till I got out of the aircraft on the deck . . . It was a pretty tough go . . . I thought we had really had it."

Investigators concluded that the primary cause of this incident was material failure of the aileron actuating linkage bolt.

In the closing remarks in his report, the squadron commanding officer paid high tribute to the pilot's performance.

"I would like to depart from the accepted practice of not including praise for a job well done in the mishap report," he wrote, "in order to state my admiration for the pilot's courage, professionalism and skill in the face of this situation in which one wrong movement would have resulted in tragedy. His almost incredible feat of flying has not only saved the lives of himself and his crewmen but also preserved a valuable aircraft. That this aircraft was saved is now resulting in a program of inspection throughout the A-3 community which no doubt will save other aircraft which might otherwise be lost due to similar mishaps."

All in all, it was quite an April evening. ◄

VERTIGO and Related States

By LCDR C. R. Mock, MC
Medical Officer
USS ESSEX (CVS-9)

Disorientation in flight will be experienced by most normal pilots. The goal is to reduce to a minimum its degradation of flight performance. – USN Flight Surgeon's Manual

Definition: Vertigo is medically defined as a subjective sensation of the patient revolving or the room revolving about the patient. In aviation, the term vertigo may also include feelings of confusion, disorientation and loss of equilibrium. The latter states will be included in the meaning of vertigo as used here.

Neurology: On the ground, man is always oriented by use of the sensory inputs from his eyes, labyrinths, muscle and joint sense, skin and other organs. There is always a constant force of gravity acting in a constant direction for reference. When flying, other centrifugal forces may increase, decrease, neutralize or reverse the pull of gravity. The pilot no longer has physical contact with the earth. The aircraft is acted upon by other forces as well as gravity and the pilot's sensory inputs can be *misleading and conflicting.*

Blind and IFR Flying: *Blind flying* is flying without visual reference to the position of the ground. To do so successfully reference to instruments in the cockpit is necessary and this, then, is called instrument flying.

In any kind of flying the body balance center, the labyrinth, is not able to maintain aerial equilibrium in the *absence of vision.* In coming out of spins (deceleration of angular motion), the labyrinth may produce a sensation of reversal of motion. This *illusion of reversal of motion* may lead the pilot to enter another spin since he would tend to correct for the illusion of rotation by actually directing the aircraft back into the direction of spin. Aerial equilibrium requires that sight, muscle sense and labyrinth (balance center) sense function correctly and in agreement.

Vision is a reliable sense; muscle sense is variable; labyrinthine sense is powerful but very unreliable. When the body is rotated without visual reference points messages will be sent to the brain but each and every one of these messages will be false. In IFR flying, instruments (turn-and-bank indicator or artificial horizon) act as a point of reference to judge the relationship of the aircraft to the ground. However, the false impressions will still exist. *The aviator must be taught to believe the instruments* and ignore his other conflicting impressions. This must continue throughout his entire flying career. The trap of the illusion of reversed motion consists of a spin, recovery from a spin,

development of vertigo and a second spin leading to a crash.

Eight other illusions during banks and turns in blind flight are well defined. *Unperceived motion* can occur if changes in direction or acceleration are very slow, below the sensory threshold. *Sensations of climbing while turning* result from the centrifugal force in a level turn pressing the buttocks into the seat. The natural reaction is to push the stick. *Sensations of diving during recovery from a turn* result from the decrease in pressure on the seat, causing a tendency to pull back on the stick (climb, stall). *Estimation of the degree of bank* is difficult in IFR flying since the rate of bank may be below the threshold of perception.

This can lead to an over-correction and banking in the opposite direction when attempting to return to level flight. *Unperceived banks* occur because the gravity downward and centrifugal forces acting laterally combine in a vector in the vertical axis of the aircraft, giving the illusion of sitting erect. The *sensation of opposite tilt in a skid* is felt because the centrifugal force is no longer perpendicular to the transverse axis and the sensation is that of being banked in the opposite direction. The *illusion of turning* occurs when a sharp correction of a gradual turning of the aircraft from its proper course is done; this may be followed by the sensation of being in a continuing turn. A *sensation of diving beyond the vertical* occurs when the head is turned downward after entering a spin or sharp turn. This occurs because the head movement abruptly puts a different semicircular canal of the labyrinth into the plane of rotation. This is called a Coriolis reaction and produces marked vertigo. Therefore, a sharp turn or spin is not the time to lean over to pick up a flashlight.

Oculogyral illusion: If a person is rotated in the dark with his eyes fixed on a light which rotates with him, the light appears to move in the direction of motion ahead of its actual position. When the rotation is stopped, the light is seen to move rapidly in a series of jerks in the opposite direction. This is the result of the interconnections between the labyrinth and the eye muscles.

Oculogravic illusion: Certain movements of the aircraft cause an illusion of a rise or descent of a lighted target. Forward acceleration on takeoff may cause a false sensation of a nose high attitude causing the pilot to lower the nose and crash. During decelerations, such as extending dive brakes, the illusion of diving may occur. The pilot tries to correct by pulling back on the stick and a stall occurs.

Autokinetic illusion: This is an illusion of perception of motion of a lighted target when it is not moving (often demonstrated in night vision trainers by sitting in a darkened room looking at a light on the wall). The problem occurs in night formation flying when it may be difficult to decide whether movement of the light is apparent or real. Displaying more than one light provides more visual references.

Fascination in flying: This term describes a state of narrowed attention associated with excessive concentration on one thing. Unfortunately, it is most apt to occur during gunnery, bombing, formation and instrument flying and landings. It is not limited to student pilots. The classic example is the wheels-up landing or being so intent on getting bombs on target that the pilot flies the aircraft into the ground.

Miscellaneous: Certain cockpit structures may be tilted. An aviator may fly the instrument panel straight and level but have one wing down. Cloud layers may not be exactly horizontal causing "drop-wingitis" or climbing or descending if the clouds are used as a horizon. A cluster of lights on the ground or a group of stars may be misinterpreted as a formation flight.

Prevention: There are no means known to select aviators who are not susceptible to vertigo. Prevention rests with education and training, improved instrumentation and practice. Pilots tend to lose instrument proficiency unless they use it. Similarly, tolerance to vertigo-producing situations increases with exposure to these situations and decreases with a cessation of flying.

Conclusions: Vertigo and related states occur because of conflicting sensory input data. A feeling of equilibrium in blind flying can be totally unreliable unless instruments are used and *believed*. Data obtained from the juxtaposition of buttocks and seat can be fatally misleading.

An aviator's ability to have confidence in his instruments stagnates with disuse. Re-establishment of such ability is an important byproduct of instrument checks. Continued education in the types of vertigo and their mechanisms must be stressed as the prime means of reducing mistakes blamed on "disorientation." ◄

notes from your flight surgeon

Ring Costs Finger

WEARING a ring while performing maintenance work cost an ADJ-3 the little finger on his right hand. As he jumped the last two feet to the hangar deck from a vertical access ladder on a maintenance stand, the ring apparently caught on the protruding end of an assembly bolt on the stand railing. As he jumped, his full body weight was suddenly exerted on his little finger and amputated it.

"Although the injured man was not intentionally careless," the squadron commanding officer wrote in his report, " it is well documented that most accidents are caused by a chain of events. In this case the facts indicate that this ground accident was the result of two careless acts by one individual: wearing a finger ring while performing maintenance and improper descent from a ladder. Had either of these acts been eliminated the accident would probably not have occurred."

Photo shows the position of the mech's ring when it engaged an assembly bolt of the maintenance stand.

Investigating flight surgeon's comment: "Although the hazard of wearing rings around machinery is well known in general, and in this case to the injured man, this safety precaution should be emphasized repeatedly at branch levels as part of the overall safety program."

Beeper Interference

AFTER 1½ hours on the ground, an F-8E pilot who had ejected was rescued principally because of his PRC-63 radio. Communications with the first helo on the scene were poor because the survivor's PRT-3 seat pan radio, which had activated automatically and had been overlooked by him, caused considerable interference.

A half-hour later the survivor heard a second helo. Using the PRC-63 and a flare for the final sighting, he directed the helo toward him and was rescued by means of the jungle penetrator.

Payoff

"WHEN our helo crashed on takeoff from the deck of the carrier, it pitched forward and rolled to the right. Everyone had his seat belt fastened. This was the first time I'd fastened mine in seven months in-country. The crew insisted on it and I attribute much of my well being to it." – *Passenger*

Savvy Student

A STUDENT pilot was leading a section of aircraft back to base. After the aircraft had descended to 1000 ft after passing the initial, a bird struck and broke the left windscreen panel. Debris spattered the student's helmet and visor. The impact of the remnants of the bird could have been disastrous, the squadron report stated, if the student had not been complying with NATOPS procedures – helmet visor down.

Assist Your Rescue

WHEN a plane is searching for survivors, it is easier to sight an object 3 ft wide and 3 miles long than to sight a raft 2½ ft by 4½ ft.

The moral is: trail a dye marker behind your drifting raft. The dye will remain visible for an hour or

more except in rough seas and in that hour you will have drifted about 3 miles, leaving your green trail behind. The marker will continue to stain the water for a minimum of three or four hours if you open the flap very slightly – just enough to leave a trail.

In a moderate sea the dye marker will last only 20 to 30 minutes if you open the flap completely. It is suggested that the marker be removed from the water at sunset to conserve chemicals. Place the dye marker in the water again an hour before sunrise so the maximum length of trail will be laid by the time it can be seen.

If you have to use your shark chaser, try to keep it to one side or under the dye as the black shark chaser will obscure the green dye. – *1st MAW Professional*

Interruption

INTERRUPTION of habit pattern can cause trouble in personal survival equipment preflight just as well as it can during aircraft preflight. An F-4B RIO was without survival radios after an overwater ejection for this very reason.

"Right after parachute opening, as I watched the airplane disappear into a cloud," he recalls, "I began telling myself how stupid I was for not having worn my survival vest with my radios in it. I had been interrupted while putting on my flight gear and I didn't notice that I didn't have the survival vest on until I got out on the catwalk just prior to manning the airplane."

The pilot used his radio to broadcast his location and thus expedited the rescue of the RIO.

"Fortunately," the investigating flight surgeon comments regarding the RIO's lack of survival radios, "the survival situation in this case was optimal."

An in-country ejection might very well have had a different outcome.

Retain Helmets

WHEN a fire occurred on landing in an OV-10A, heavy fumes and smoke caused both pilots to exit the cockpit on the port side after removing their helmets. The left pilot's canopy struck both pilots on the head as they jumped down; neither was injured.

Noting that the pilots should not have removed their helmets prior to exiting the aircraft, the squadron report states that a recommended change warning of the danger of being struck by the port side canopies will be submitted to the NATOPS Manual.

Ear Plugs

THE SQUADRON has an abundance of ear plugs. No person should be anywhere near an APU or aircraft turning up without the minimum required ear plugs. The minimum time required for ear plugs is considered as transit time to and from the aircraft. All prolonged operations in and around the aircraft will require Mickey Mouse ears with ear plugs for maximum protection. Item closed.

VP-4 Safety Council

Self Help

"BOTH survivors helped themselves and us by deploying their daysmoke flares at the right time and then proceeding to get out of their rafts as we made our approach."

SAR helo pilot

Smooth and Speedy

PILOT and RIO of an F-4B were rescued smoothly and speedily after their ejection over water. The SAR helicopter pilot credited the very fast pick up to the following factors:

- Both survivors knew their personal survival equipment and how to use it.
- Both survivors knew their rescue procedures and what was expected of them.

The SAR pilot stated that the survivors made the rescue job less complicated by touching their D-rings on their harnesses before entering the water from their rafts. This indicated to the helo crew that they were expecting hoist by hook.

"Our fire prevention program (excuse me a minute, sir) is the best in the Navy."

For the sake of argument . . .

MAINTENANCE and flight safety?

S/L BB Finn SOAE/ATCHQ (retired)

AIRCRAFT maintenance has a pretty good record – insofar as involvement in the more tragic aspects of Flight Safety is concerned – but the record is not as good when viewed in terms of the frustrations and minor panics which are generated by delays at takeoff time or inflight equipment failures. Since such disturbances to the nervous system may well contribute to those miscalculations statistically recorded as *pilot error*, it might be timely to review why these things happen and see what can be done to keep them to a minimum.

In today's language we usually describe an aircraft as complex – which it is – but our use of the term tends to imply that it is complicated, difficult to understand and very tricky to keep in top shape. This is not true. The modern aircraft is basically very much safer than aircraft built as recently as 10 years ago. Its alleged complexity stems in large measure from built-in redundancy (which is a fancy name for backup systems and structures), not to mention warning devices and onboard automatic diagnostic equipment. The real problem with modern aircraft is not reliability but speed and its effect on the decision-making processes.

These days, the pilot is becoming a jack-of-all-trades; he absorbs the functions of navigator, radio officer and systems operator – not to mention a preoccupation with a raft of documents, rules and procedures, FLIP charts, diplomatic clearances, customs declarations, imprests, *ad nauseam*. But a jack-of-all-trades' depth of knowledge in each trade tends to become superficial; couple this to a shrinking time span for decision-making and the probability of an accurate diagnosis and response to an inflight anomaly is reduced. We buy decision-making time with duplicate or even tertiary systems and by the installation of various diagnostic warning devices. However, in so doing we add to the chances of an unserviceability in the aircraft as a total system without necessarily having an unserviceable aircraft in terms of its safety for flight.

Which brings us back to the maintenance dilemma. There is no way of guaranteeing that every item in an aircraft will be 100 percent serviceable at takeoff and there is even less chance of the aircraft completing the flight without some malfunction. In spite of this there is

. . . there is a growing weight of evidence that the real reason why aircraft serviceability improves as utilization increases is simply because the aircraft spends less of its life in the hands of the maintainers!

an extremely high probability that the aircraft will be completely safe for flight because of the built-in redundancy; therefore the problem becomes one of finding a mutually acceptable standard. This boils down to a question: at which point does routine maintenance become over-maintenance?

Most of us who are connected with aviation are aware of the truth of the statement that the best way to keep an aircraft serviceable is to keep it flying. Some consider that this theory is based on the double standard which may be expressed as "serviceable for a trip up North" and "serviceable for the return trip South." There is no doubt that this double standard exists, just as there is equal certainty that the longer a pilot stays with one particular aircraft, the more familiar he becomes with its peculiarities. But there is a growing weight of evidence that the real reason why aircraft serviceability improves as utilization increases is simply because the aircraft spends less of its life in the hands of the maintainers! To many of us who have spent a lifetime in the aircraft maintenance business it is a bitter blow to find that our work has to some degree resulted in an aggravation of the very condition we hoped to cure.

Where did we go wrong? The answer is simple. In trying to ascertain the state of health of the aircraft without possessing even the most rudimentary diagnostic equipment we periodically disembowel the machine to poke and pry into its innards. The residual disturbances, plus what may be termed *post-operative shock*, result in the aircraft being more defective immediately after our inspection than it was before we started. Our other "crime" is that we change components on an arbitrary life basis. This routine removal-and-overhaul cycle keeps components within the critical stage of life. To use a medical analogy, we retain aircraft components only during their *infant mortality* range instead of letting them progress into stabilized middle life and changing them as they approach the period of old age.

Our problem now is to find an answer which satisfies our own consciences that we are providing optimum safety and that this will be recognizable as such by our customers – the flight crews. It is fairly certain that suitable nondestructive diagnostic equipment is a long way off and the diagnostic equipment which is presently available is very limited. Furthermore, even when this equipment becomes available, there is no guarantee that we can eliminate all inflight/preflight failures; predicting the precise failure time will remain very much a matter of educated guessing.

The only logical answer at present is to limit our maintenance processes to those which can be completed without causing residual damage and to place greater emphasis on statistical analysis to determine the right time for inspecting each item. This will require some radical revisions in our thinking as well as a major information program to explain the problem to our customers.

This part of the job will be extremely difficult since we have brainwashed both ourselves and our customers into a belief that an aircraft is a rather unreliable beast which has to be torn asunder at surprisingly frequent intervals if the flight crews are to have a reasonable chance of survival. Furthermore, it will require an honest appraisal of our concept of a reasonable and consistent workload to ensure that our attitude towards inspections is not more closely related to one of Parkinson's Laws than it is to engineering requirements.

One of the most suitable forums for generating discussion on the subject and creating a mutual understanding of the problem is this magazine. If we all get together to talk about maintenance and really get to understand just what it can do and what it cannot do, we will make greater strides in the direction of flight safety than we have done in the years gone by.

Adapted from RCAF "Flight Comment"

It Pays to Wait!

by Roger Emett

(Automatic vs Manual Separation on the Martin-Baker System)

AFTER EJECTION in the Martin-Baker H5/H7 seat it takes far longer to achieve a full parachute with the manual override system than with the automatic ejection sequence and a much greater loss of height is involved. Despite this, there have been some cases in recent months where pilots have ejected above barostat altitude and used the manual override for separation and manual parachute deployment using the ripcord D-ring when it would have been wiser to have let the automatic sequence do its job for them.

A tragic accident occurred in Southeast Asia when an F-4 back seater used this manual override handle unnecessarily. The crew had experienced flight control problems at low altitude but had managed to coax the crippled aircraft up to 16,500 ft before ejecting. The aircraft commander ejected without any trouble and was uninjured in the escape. However, the rear seater's parachute did not deploy after ejection and he was killed.

The investigation revealed the parachute ripcord handle D-ring was still in the retaining clips and the parachute link-line which deploys the parachute under the automatic sequence had been cut by the guillotine. The ejection seat had landed some 300 ft from where the body had struck the ground. The emergency harness release handle had been used and had operated correctly to release the harness attachments and to fire the guillotine. The seat automatics were put on test and, after free falling from altitude, these items still checked out within the prescribed tolerances. It was evident that the seat had functioned as designed. If the emergency harness release handle had not been used above barostat altitude, automatic seat separation and parachute deployment would have occurred.

In this particular case, the parachute D-ring handle was very tight in its retaining clips and it was found that a force of 70 lbs was required to pull it out of the clips to allow deployment of the parachute manually. The

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lower stitching securing the ripcord handle retaining plate to the parachute harness had pulled away from the parachute harness.

The actual sequence of events which led to this unfortunate accident may never be known for sure. However, the available evidence suggests three main possibilities:

a. The co-pilot ejected and became anxious about the time elapsing while free falling in the seat on the 5-foot drogue and elected to use the manual override system. Then, having separated from the seat, he was unable to get the parachute deployed because of the excessive force required to free the ripcord handle D-ring from the retainer clips, or

b. After ejection and subsequent manual separation, the co-pilot was incapacitated or made no attempt to deploy the parachute, or

c. The emergency harness release handle was used prior to ejection . . . reaching for arm rest firing handles as on some other ejection seats by mistake. This has been done a few times on simulator rides even with experienced F-4 aircrews. If such a thing occurred the body would not be restrained and would "jackknife" under ejection loads. Injury or incapacitation would be inevitable if the seat pan ejection handle was then used. Seat separation would occur as soon as the drogues deployed and, perhaps explains the fact of the seat and body impacts being 300 ft apart. The ejection was at low speed and if manual separation occurred when the man and seat had a vertical trajectory on the drogues, the two impact points should not be far apart. The broken stitching on the ripcord handle retaining plate is equally consistent with ground impact forces. Normally, it will take considerably more than the 70 lb force required to free the ripcord handle and in this particular case, to break the stitching securing the retaining plate to the harness. To break the stitching without pulling the handle out of its housing suggests a force in the opposite direction to the normal pull.

Whatever the answer we must ensure that the circumstances of this accident are not repeated.

Time in Free Fall on the Five Foot Drogue

Few pilots have an accurate picture of the time required to free fall in the seat from ejection altitude on the 5-foot drogue, waiting for the automatic sequence to function at barostat altitude. Most are prepared to wait a reasonable time, but what is a reasonable time in such a situation? Remember that your pulse will have been racing immediately prior to ejection, and although the decision to eject has been made, and the worst is over, the unusual sensations of the ride and the realization that there is more to come will not be conducive to relaxation! In any emergency situation, time seems to be

compressed anyway. What is actually a matter of seconds may seem like an eternity when you are heading for the ground at high speed.

How long would you be prepared to wait before being concerned?

Ideally, one should wait for the automatic sequence to function. *Let's analyze it.*

Automatic Versus Manual Separations

Automatic seat separation and parachute deployment is rapid and positive. Manual separation and manual parachute deployment is not.

After ejection, the drogues stabilize the seat and ensure optimum alignment for automatic separation and deployment of the personal parachute. This will be accomplished in less than one second from shackle release, in something like 150 ft, and with no risk of man/seat involvement.

In comparison, manual separation and manual parachute deployment is a time consuming and height wasting affair. The occupant must pull the emergency harness release handle to release the lap belt, shoulder harness, and leg restraints. Pulling the handle will also operate the guillotine to sever the parachute withdrawal link-line. Since the occupant will still be attached to the seat by the sticker clips, it will be necessary to lean forward to get the parachute off its horseshoe support arch and push away from the seat to break out the sticker clips and clear the seat. All of this takes valuable time and altitude.

When clear of the seat, the ripcord D-ring handle must be pulled to full extension (3-4 inches) to open the parachute pack. But first you must locate the handle. If you are tumbling, and this is very likely, it may take longer than you think to locate the handle. Remember, the parachute pack will be free to swing around to the full extent of the risers and will not necessarily stay behind in relation to the body. If it swings forward, over the head for instance, the D-ring could be masked by the riser which would make it more difficult to locate and use. The thing to do is to look for it, then grasp the left parachute riser with the left hand just above the ripcord, and pull the ripcord D-ring handle as hard as possible with the right hand. This will open the pack, but instead of the 5-foot drogue to draw the chute out of the pack, there will only be a small pilot chute to do the job and parachute deployment will be less rapid as a result.

Obviously, there is nothing to be gained by trying to beat the automatic sequence at low level. It could prove fatal.

Another recent incident in Southeast Asia illustrates the problems associated with manual separation and parachute deployment. An F-4 pilot ejected about 14,000 ft over the sea and rode the seat down on the 5-foot drogue waiting for automatic separation. When separation did not occur after an appreciable time and deck equipment was becoming distinguishable on ships in the water below, he rightly decided it was time to use the manual over-ride. He separated without difficulty and then found himself in an inverted jackknife position with the parachute pack visible just above his head. He reached for the ripcord D-ring with his right hand but could not locate it initially until he looked for it and pulled it into view with his left hand. He pulled the D-ring but could not get it out of its housing at the first attempt. On the second attempt, he pulled the handle to its full extent but nothing appeared to happen until he pulled a third time and the chute opened. (No further cable extension occurred, so the parachute was probably deploying after the second pull.) Since the parachute descent subsequently took about two minutes down to the water, the parachute probably deployed in the region of 2000 to 3000 ft. In this particular case, it took several seconds to separate from the seat and manually deploy the parachute and a significant altitude loss was involved. The pilot showed commendable presence of mind in dealing with the situation.

The circumstances of this incident also suggest the possibility of barostat failure but as the ejection seat was not recovered, the issue cannot be resolved. Damage to the barostat or to the time release mechanism itself would prevent automatic operation at the normal altitude setting. (H5 seat 10,000 – 13,000 ft; H7 seat 11,500 – 14,500 ft.) However, there are five separate capsules comprising the aneroid in the barostat. A leak in any one of these would not negate the system, although in such an event, barostat operation would occur approximately 3000 ft below the original altitude setting.

Failure of the Automatic Sequence

Complete failure of the automatic sequence is unlikely but the possibility cannot be ignored. And since manual separation, with all its drawbacks, is the only alternative, one must know how to recognize a failure and take prompt action should it occur.

If the seat does not stabilize almost immediately after ejection, failure of the drogue gun or the drogue assembly would be indicated. The drogue gun fires 1.0 second after ejection on the H5 and 0.75 seconds after ejection on the H7 seat. If the seat does not stabilize but continues to tumble, prompt action to pull the emergency harness release handle is required for if the time release mechanism delay runs out and allows the occupant to tumble out of the seat before the guillotine is fired to sever the parachute link line, the seat would remain attached to the apex of the parachute during the descent!

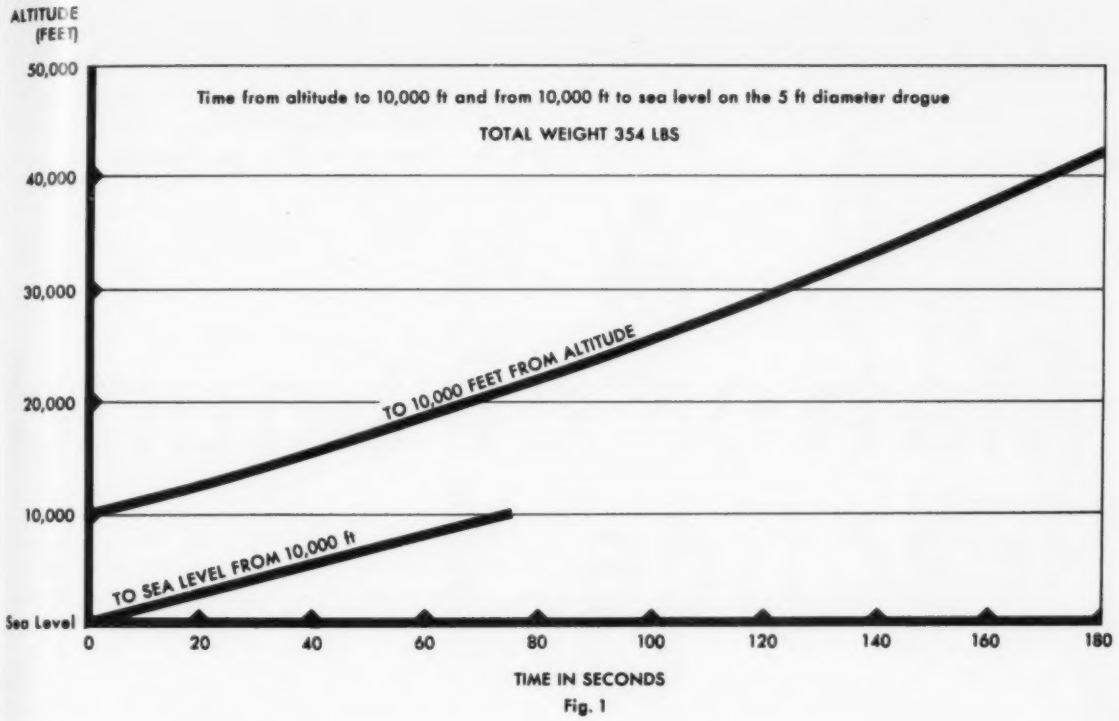

Fig. 1

Failure of the time release mechanism also requires use of the manual override system to avoid riding the seat down to ground impact on the drogues still strapped in the seat.

At night, or in a weather situation where there is no visual reference with the ground, it would be impossible to tell whether the time release mechanism has failed or not, without knowing the approximate ejection altitude and time required to descend to barostat altitude on the 5-foot drogue. The Pilots Manual gives no advice in this respect but the diagram (Fig 1) gives some idea of the time required in free fall from ejection altitude down to 10,000 ft and from 10,000 ft down to sea level, strapped in the seat, with 5 foot drogue deployed.

It takes about two minutes from 30,000 ft and over one minute from 20,000 ft to fall to the 10,000 ft level on the 5 foot drogue. Automatic seat separation and parachute deployment occurs between 10,000 ft – 13,000 ft on the H5 seat, and between 11,500 ft – 14,500 ft on the H7 seat.

If the system failed at barostat operating height, then it would take another minute at least to fall to sea level. So in most circumstances there is usually time to spare after a high altitude ejection, depending on the local terrain.

In all ejections, one should plan to use the manual override handle only if the automatic system fails . . . except for the rare occasions over mountainous terrain where the ground level approaches barostat altitude. In the latter case, it will require very prompt override action after ejection to achieve a full parachute on the manual system in less time than the automatic deployment would take . . . according to ejection altitude.

The record is good: Over 340 successful ejections have been made to date on Martin-Baker ejection seats in the USAF, and a 95 percent success rate was achieved for 1967. Over 2000 lives have been saved on Martin-Baker seats world-wide.

The Martin-Baker system has an outstanding record of reliability. So if you have to eject above barostat altitude *think positive and allow the automatic system time to function.* Be prepared to wait down to the 10,000 ft level before using the manual override. It will usually prove advantageous. – *Courtesy "TAC ATTACK"*

The following statement was made by a pilot involved in a recent P-3 ditching at sea:

"I released myself from the shoulder harness and just as I released it I heard the explosion of the PDCs; and it seemed about on the level with me. But, there again, it's very deceiving, but the concussion was felt. I felt a good concussion when it exploded. I assume it was only the two or three PDC's – or the PDC the pilot was just getting ready to drop, because the rest of them should have had safety pins still in them."

A Matter of Sound Practice

He should have and did have are two different things and something all ASW pilots and aircrewmen must be certain of at all times. The following article makes it quite clear that no matter how small the ordnance may be and regardless of what the safety record is, all ordnance must be treated with the utmost care.

LT Larry M. Smith
Underwater Weapons
Research and Engineering Station

SIGNALS, Underwater Sound, more commonly known as SUS (frequently called Practice Depth Charges), are safe ordnance devices. This seems to be the opinion of everyone associated with SUS, so safe in fact, we tend to forget they are explosive devices capable of inflicting bodily injury or death. This attitude is understandable, but unwarranted. Countless thousands of SUS have been used by a typical cross-section of naval personnel, including the always present Murphys and Dilberts, and have produced an accident-free record as well as a high operational reliability. A pat on the back for the engineers who developed this design. But, are these explosive devices as safe as their record indicates, or have we been exceptionally lucky?

The answer to both of these questions is a qualified yes. When used according to the procedures set forth in the current edition of NavAir 11-1-107 (OP 2982), they are completely and irrefutably safe. Unfortunately, there are indications that personnel using SUS do not always follow proper procedures.

The most frequently noted violation of safety procedures is the stowage and use of SUS without installing the drag plate arming wire assembly. True, SUS will work equally well without this assembly. In actuality, the only function it serves is to safe the round to protect you, the user.

As can be seen in Figure 1-a, the detonator in the unarmed and safed unit is offset from the firing pin and tetryl booster. It is located in the arming piston (detonator holder) and mechanically locked in this offset position by the arming wire. Should the detonator now explode for any reason, it is completely isolated from the high explosive in the round and the only result would be a dud SUS.

When the SUS is launched into the airstream, its forward trajectory pulls the drag plate free of the SUS and the attached arming wire out of the arming piston. The arming piston is now free and pressure actuated and will move into the armed position as the SUS descends through the water, normally at a depth of about 20 ft. Once in the armed position, the detonator is in line with the firing pin and the explosive charge (Fig 1-b). Upon reaching the selected depth, the firing pin is forced upward by the pressure acting on the firing piston (Figs 1-c & 1-d) and detonation is brought about in a manner very similar to the firing of a weapon.

The importance of keeping the arming wires installed is readily seen. Under normal conditions even

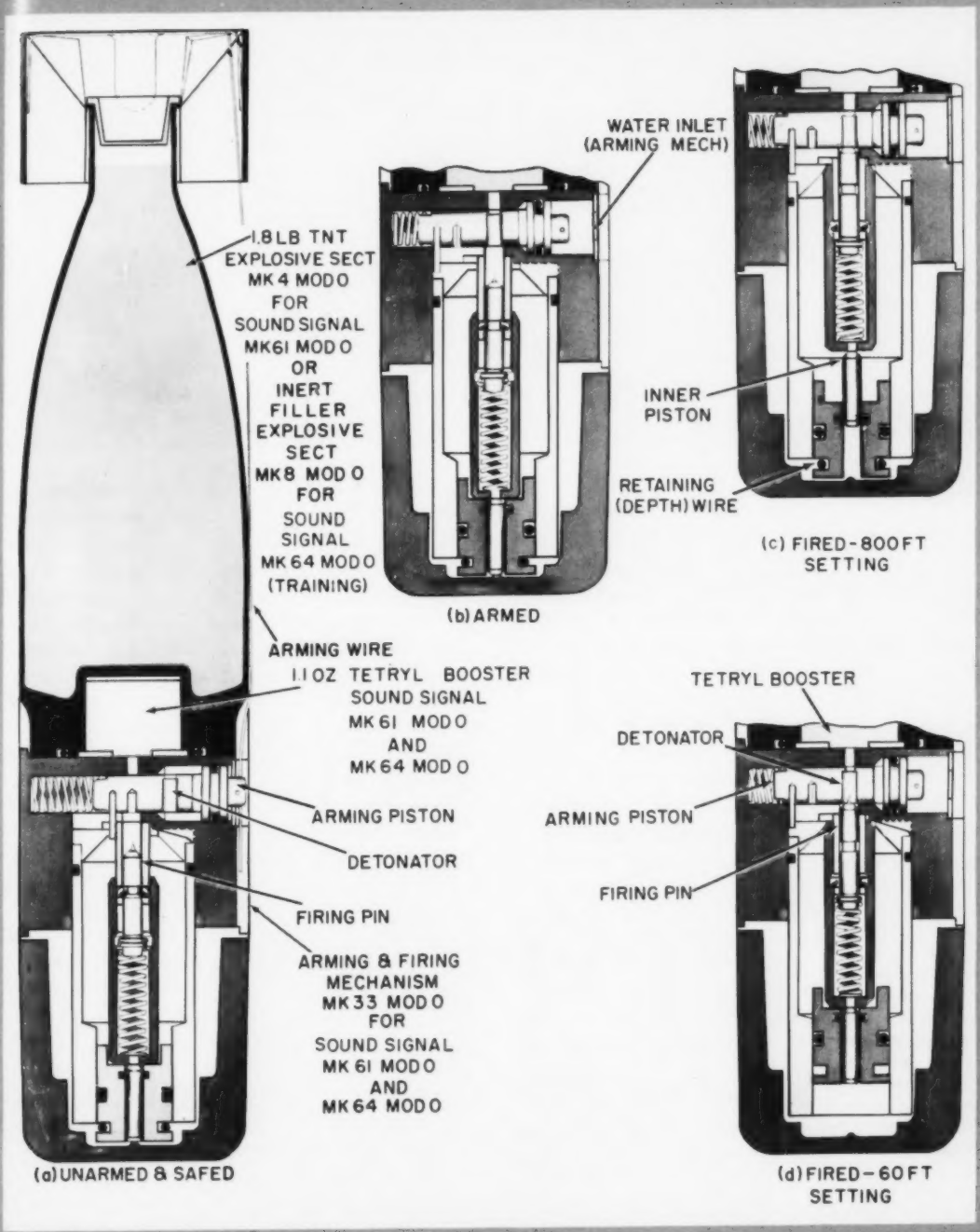
1.8 LB TNT
EXPLOSIVE SECT
MK 4 MOD 0
FOR
SOUND SIGNAL
MK 61 MOD 0
OR
INERT
FILLER
EXPLOSIVE
SECT
MK 8 MOD 0
FOR
SOUND
SIGNAL
MK 64 MOD 0
(TRAINING)
ARMING WIRE
1.1 OZ TETRYL BOOSTER
SOUND SIGNAL
MK 61 MOD 0
AND
MK 64 MOD 0
ARMING PISTON
DETONATOR
FIRING PIN
ARMING & FIRING
MECHANISM
MK 33 MOD 0
FOR
SOUND SIGNAL
MK 61 MOD 0
AND
MK 64 MOD 0
(a) UNARMED & SAFED
WATER INLET
(ARMING MECH)
(b) ARMED
INNER
PISTON
RETAINING
(DEPTH) WIRE
(c) FIRED - 800 FT
SETTING
TETRYL BOOSTER
DETONATOR
ARMING PISTON
FIRING PIN
(d) FIRED - 60 FT
SETTING

Figure 1

with the arming wire removed, the round will *probably* be safe – the detonator held offset by the spring tension working against the arming piston. The chance of the detonator going off when in line with the charge is very small indeed, but, the possibility does now exist. Move this unsafed charge into the environment of an emergency and this possibility begins increasing rapidly.

The most dangerous condition arises during a ditching situation. If these charges are not safed by the arming wire they will detonate, with their well known reliability, when the sinking aircraft passes the depth for which they have been selected. For a shallow SUS, this will be at a depth of 54-66 ft. For a survivor swimming in the vicinity of this detonation, the overpressure from even the 1.1 oz tetryl booster in one Mk 64 SUS could cause minor ear or internal injury; from the 1.8 lb charge in the Mk 61 and Mk 57, it could be fatal. Dr. D. K. Hartmann of the Naval Ordnance Laboratory, in a study titled, *"The Physical Aspects of Underwater Explosion Damage to Swimmers,"* states that the Lethal Distance for a human swimmer from an underwater explosion can be approximated by the equation:

$$D_L = 44\sqrt[3]{W}$$

D_L = lethal distance in ft

W = weight TNT or equivalent in lbs

For a 1.8-lb charge, this lethal range would be in the vicinity of 53.5 ft. Deterrent distance, or that distance at which injury would occur, is approximated according to Dr. Hartmann by the equation $64\sqrt[3]{W}$. However, he also refers to a study conducted by a British group in which 4 out of 6 submerged swimmers sustained minor ear damage from a 5-lb charge of TNT at a distance of 400 yds. Study and information in this area is so limited that no positive statement can be made concerning damage distances. However, if an entire rack of SUS set shallow were to explode at or near the same time, (it can be assumed that the overpressure created by one explosion would induce almost simultaneous explosion in all other SUS without arming wires installed and selected for the same depth as they will have all been armed by this time), the distance could become quite large.

Recent shock tests were conducted by the Naval Underwater Weapons Research and Engineering Station on an experimental torpedo using 2.25-lb charges of TNT. These charges were placed at a depth of 30 ft, 200 ft from the ship. At this distance, the shock on the ship seemed simultaneous with detonation and of such magnitude that the entire vessel vibrated. Good luck to a swimmer in the near vicinity, even one using the famous Navy concussion swim!

We all hope that the plane we're flying in, and the crew we're flying with, will never be involved in an emergency situation. But, ditchings at sea by ASW aircraft do occur. It might very well be worth a minute to check the SUS prior to your next flight. ◄

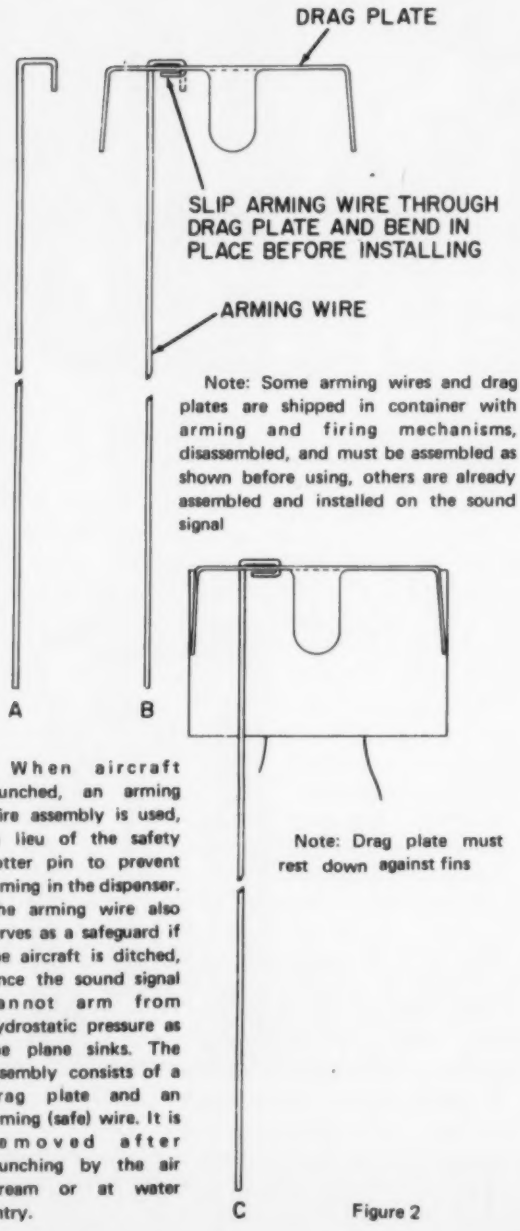

Figure 2

Cut Out Crunches

TOGETHERNESS is an admirable quality when referring to crew coordination or to a pilot/LSO relationship. In our every day society it is a relationship which has been encouraged between parents as well as between parents and children. However, in the work-a-day world of naval aviation, ashore and afloat, this relationship between aircraft is not desired.

Almost daily, messages and speedletters flow into the Safety Center pointing out, over and over again, the coming together – inadvertently – of aircraft. This kind of togetherness we can do without. It is unfortunate that crunches have become a way of life. Some of us no longer get excited about them. It's all too common place. This is an area where we all can "do something." Let's cut out crunches.

No type or class of aircraft is immune to a crunch. It is true that helicopters and carrier types are more susceptible than transports for example because more crunches occur aboard ship than anywhere else. Within the Department of Defense there has been a successful ZD program (zero defects). There has been a successful WOW program (war on waste). It is time to start a new Navy program – COC (cut out crunches).

Our choppers seem to be involved in more crunches than any other type. During one month of the first quarter FY 69 the following were typical of some of the needless, wasteful incidents all involving ground handling.

- One SH-3A aboard a CVA suffered two bent tail rotor blades caused by improper towing procedures.
- Another SH-3, aboard the same CVA above, suffered a bent and buckled sponson, broken internal spar and torn flotation bag when a tractor backed into it broadside.
- One CH-46 had the yellow main rotor blade bent and torn when the maintenance crew, attempting to tow the helicopter through mud, caused the blade to strike the hangar.
- Two UH-2's were damaged when one, being manually pushed, lurched into the other one. A deflection caused by crossing a paint hose brought them together.

A truly fertile area exists here, in the land of the crunch, which is worth the consideration and best efforts of all aviation personnel. Take action. Any action which will prevent a crunch.

Letters

Flying with a cold is not good headwork.

MECH Query

FPO San Francisco – I heard of a magazine called MECH through friends in another squadron. From what I gathered it is a magazine for mechanics. Being a mech myself I would like to know how I can obtain a copy and other details concerning its contents.

WESTPAC MECH

• Too bad you didn't include your name and address so a direct response could be provided. MECH is distributed to all squadrons listed in the Navy Standard Distribution List. Squadrons receive a *minimum of 25* copies and each copy is intended for 10 readers. It is suggested that you contact your Aviation Safety Officer and find out whether your outfit is getting its share.

MECH is published quarterly. Its contents are aimed at the entire spectrum of aircraft support technicians – from the airman on the line to staff level types. Material for the magazine is generated through correspondence and reports from the operators of our aircraft. They are the people with the experience, know-how and the problems. If we can be of service in any of these areas, please let us know.

Fence or Ambulance

NAS Lemoore – Somehow I missed your reprint of "The Ambulance in the Valley" in the July issue of APPROACH. I first saw reference to it in the November Letters section, otherwise I would have written earlier.

Unfortunately my old cohorts in VT-25 did not have, or you did not print, the whole poem. The last two verses, which are omitted, are the most important to the poem from a safety point of view. They sum up what the safety program is and what it should do.

I first came across this poem in high school in a book entitled *Best Loved Poems of the American People* edited by Hazel Felleman, a onetime editor of the "Queries and Answers" page of the NEW YORK TIMES. The book was published in 1936 by the Garden City Publishing Company, Inc. Heaven only knows when it was written but the author *is* known to be Joseph Malins.

The enclosed version of the poem differs somewhat from the APPROACH text but it does contain the all-important last two verses which I am sure your readers would like to have.

LCDR Hugh R. Taylor
VA-122 FFT VA-113

But a sensible few, who are practical too,
Will not bear with such nonsense much longer;
They believe that prevention is better than cure,
And their party will soon be the stronger.
Encourage them then, with your purse, voice and pen,
And while other philanthropists dally,
They will scorn all pretense and put a stout fence
On the cliff that hangs over the valley.

Better guide well the young than reclaim them when old,
For the voice of true wisdom is calling,
"To rescue the fallen is good, but 'tis best
To prevent other people from falling."
Better close up the source of temptation and crime.
Than deliver from dungeon and galley;
Better put a strong fence round the top of the cliff
Than an ambulance down in the valley.

Joseph Malins

• No question about it. The last two verses do indeed point out the action "sensible" people will take. It is also the sum and substance of our being here at the Safety Center – prevention is better than cure. Thank you for this information. Readers, take heed!

Back Pat

George AFB, California – First, I would like to commend you on the outstanding contribution to Flying Safety you print each month, your magazine, APPROACH. Although we of the 431st TFS at George fly F-4D aircraft, we enjoy reading of the exploits of our brothers in Naval Aviation, whether in F-4 or any other or your Attack and Fighter aircraft.

All of your articles expound one rule that has no exception in this business. Good Sound Judgement. We operate an RTU here at George AFB (similar to your "RAG") and our people who are new to the fighter pilot business look forward to reading APPROACH. Unfortunately, we have had to scrounge issues up to this point, and missed quite a few.

We would appreciate it if we could be

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, Naval Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the Naval Safety Center.

included on your mailing list for at least one copy per month. Thank you for your help in promoting safety while achieving 100% success in mission accomplishment.

John B. Olson, CAPT., USAF
431st TFS Stan/Eval

• It is always gratifying to know our efforts are "striking home."

See the bottom of this column for subscription information. Should you have any information or experiences you feel of interest to Navy F-4 operators please feel free to send them to us. We are always open to suggestions for improvement. Thank you very much for your letter.

Low Carbohydrate Diet

FPO, New York, N.Y. – I would like to make a few comments regarding the "low carbohydrate diet" and Dr. R. E. Carlson's recent article in APPROACH (September, 1968).

The variations in diets grouped under the title of "low carbohydrate diets" is as great as the variations in "flying machines" also called "aircraft." This ranges from little or no diet modification where the name alone is used for fad value to the severe across-the-board restricted diet Dr. Carlson's article deals with, more commonly called the "ketogenic" diet.

Although I do not wish to take exception to the many fine points in his article, I have used a modification of the "low carbohydrate diet" in VP-10 among aviators with significant results and no suggestion of ill effects. It is my feeling that the statistical and individual danger of obesity is far greater than the theoretical considerations of a dietary extreme misused.

Dr. Carlson's point is well-taken to the extent that:

1. No aviator should diet when there is no reason for him to diet.
2. Any diet that he undertakes should be approved by his flight surgeon.

LT C. C. Morrison, MC
VP-10

• Thank you for your letter. We also heard from LCDR J. B. Boorstin, MC, of NAS Cecil Field who states that the Pennington diet (low carbohydrate) has been used under medical supervision at NAS Cecil Field since 1966 and that at no time has any pilot or NFO experienced any difficulties whatsoever while flying.

Here are Dr. Carlson's comments:

"I wish to thank Dr. Morrison for pointing out the confusion in understanding what is meant by *low* carbohydrate. The most obvious first step in cutting down on calories is to eliminate the 'goodies' – candy, cakes, pies, bread, potatoes and (sorry) beer. All these foods are high in carbohydrate so that their elimination would make the total diet lower in carbohydrate respectively. It takes a dramatic reduction in carbohydrates to stay below the 50 gram limit of the 'ketogenic diet.' I believe the reducing diets of aviation personnel should include more than 50 grams of carbohydrate to avoid beginning the ketogenic process. I would be happy to forward supporting medical references to any who would wish to review them."

Sleeves

Fort Eustis, Va. – The enclosed picture was on page 8 of your October issue. I have circled the uncovered arm of the copilot-gunner.

We in the Aviation Maintainance Training Department of the U.S. Army

Transportation School continually stress that sleeves must be kept down and fastened during all flights. The nomex flight suit and gloves won't do much good if the sleeves are pushed or rolled up to the elbow.

John R. Dunham, Jr.
LTC U.S. Army

• We most heartily agree that the pilot in question is indeed in error. All Navy training is pointed toward correcting such habits by members of air crews. As uncomfortable as the flight gear may be on a hot summer day it can by no means approach the discomfort of severe burns. We should have selected another picture for APPROACH. As for you in the photo and the rest of you readers – *roll those sleeves down!*

Snowballed

Washington, DC – Reference is made to the article on the "How To" of Snow Removal in the November issue of APPROACH. NAS Brunswick, Me. is not the northernmost Naval Air Station in the Continental United States. The following are further north in the contiguous 49 States: NAS Minneapolis, NAS Sand Point and NAS Whidbey Island. Since Alaska is also on the Continent and is one of the States, the air stations at Adak and Kodiak cannot be ignored. However, the -20^{0}F temperature and the 88 inches of snow at Brunswick could be the "mostest" of something.

A. B. Moe, (P.E.), Head
Technical Branch (Code 1013)
NavFacEngCom

• The cold facts are that NAS Brunswick is not the northernmost Naval Air Station in ConUS and our faces are red for having so stated. A nameless Texan on our staff takes exception to the mention of Alaska as a contender. We agree that 88 inches of snow ain't hay and when you start shoveling it out of your drive, only to have the snow plow push it back in, you'll think you're at the North Pole.

Vol. 14 **approach** No. 7

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

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NavWeps 00-75-510

CREDITS

Cover painting by Blake Rader exemplifies the constant vigilance through professionalism as shown by the E-1B on station.

IFC, 5 photos top (left, middle, second row right) by JO3 K. B. Dalecki

Pg 1, 4 (top left, middle), 5 (main photo, top right, second row left) by PHAN D. A. Wilding, VP-21

Pg 24-25, photos by Gerald R. Boling

Pg 29, photo by Art Schoeni, courtesy LTV

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Next Month The History of Rotary Flight

"My boy take care
To wing your course
along the middle air:
If low, the surges
wet your flagging plumes;
If high, the sun
the melting wax consumes . . .
But follow me: let me
before you lay
Rules for the flight
and mark the pathless way."

Flight Safety

By Wing Commander Daedalus
Minos Experimental Flight

Marvel not if I appear talking to you on superterrestrial and aerial topics . . . I have travelled in the stars.

Already credited with the invention of the axe and the saw, and now a noted Athenian architect, I set myself to be a perfect master in the art of flying. There seemed to be but one method, to procure wings of some kind or other and by their assistance to ascend in my own person to heaven. This done, I made a trial of what I could do, by leaping upwards, endeavouring by constantly striving upwards to bring all the muscle into exertion for aiding the flight.

Perceiving now that the project succeeded I grew bolder after experiment and my courage increased with my dexterity. I determined no longer to confine myself to these essays, but to instruct my son, Icarus, in the art.

By diligent perusal of Notes for the Airman, which I myself had written, which later the Roman poet Ovid was to name Dash One, Icarus was prepared well enough to take the untried wings. The boy, whose thoughts aspired to loftier aims, grew wild and wanton in his flight, heeding little my pre-flight briefing. His feathers gone, no longer did he take air. Down to the sea he tumbled from on high and found his fate.

Let me thus act as the Gods of Wisdom and entreat you be heedful of the fate which encounters those scornful of Flight Safety.

Courtesy Royal New Zealand Air Force **Flight Safety**

What you don't know can hurt you, too.

Anon.